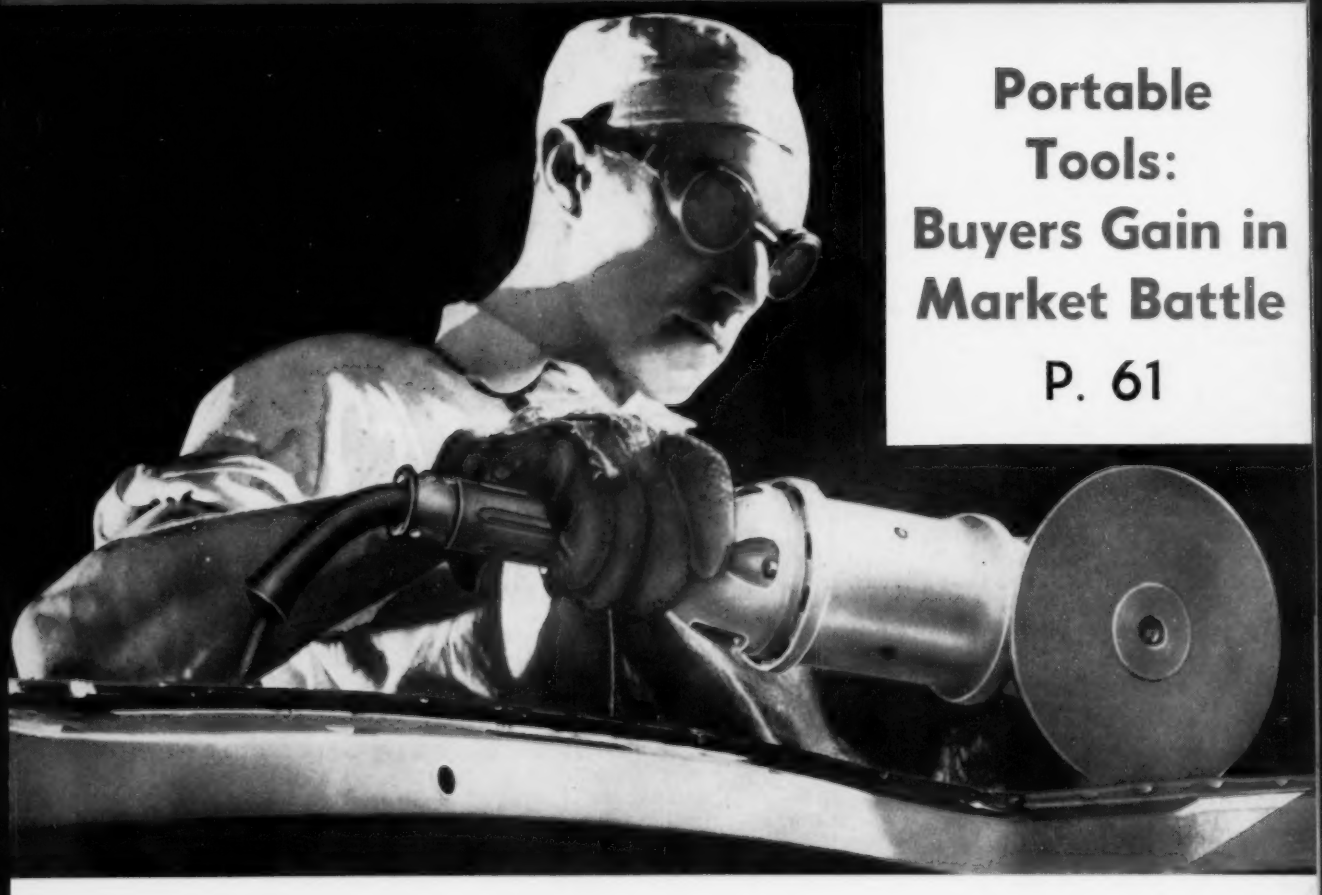
February 16, 1956

The IRON AGE

The National Metalworking Weekly



Portable Tools: Buyers Gain in Market Battle

P. 61

Are Reds Winning The World Steel Race? P. 64

Why You Should Give Plastics A Second Look P. 59

Digest of the Week P –2

GUNCHROME-M
Because of its chemical bonds, plasticizing agents, and carefully controlled sizing, Gunchrome-M adheres well to hot furnace walls and forms a dense, strong structure similar in composition to chrome-magnesite brick.
FURNACE MAINTENANCE
BRI GUN
Designed for Gun Maintenance of Furnace Structures
SAVE TIME, SAVE MONEY, BALANCE FURNACE LIFE

Write for this new bulletin on

GUNCHROME-M...the chrome-magnesia refractory for quick, hot repair of critical furnace areas

● If you are concerned with furnace operation and maintenance, you'll want to know more about Gunchrome-M.

This unique chrome-magnesia refractory is applied by air emplacement to back walls, skewbacks, front walls, end walls, arches, uptakes, and other critical areas.

Not only is Gunchrome-M an easy effective method of repairing hot furnaces, but it insures:

1—balanced furnace life through maintenance of critical areas. 2—reduced brick replacement at rebuild by periodic maintenance throughout furnace campaign. 3—the ability to meet emergency needs for extending furnace life beyond normal campaign expectancy.

Ask your Basic Sales Engineer for facts and figures on Gunchrome-M as revealed in actual application reports. Or write for Gunchrome-M Bulletin G-101 illustrated above.

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Tool Steel Topics

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA. On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corp. *Export Distributor:* Bethlehem Steel Export Corp.

Want Fast Tool Steel Service?

SEE YOUR BETHLEHEM DISTRIBUTOR

Whether you want to order a quantity of tool steel, or merely a short bar, or just would like a bit of advice about the correct method of heat-treatment, you're sure to find your Bethlehem tool steel distributor anxious to be of service.

Prompt service is your distributor's middle name. He makes it a point to know your city like a book—its background, its people, its industry. He knows what grades of steel you are most likely to need, and in what quantities. And so he keeps large stocks of Bethlehem tool steel on hand, in a virtually endless variety of types, all of them ready to go at a moment's notice.

If you would like bars cut to special length, or if there's a tricky phase of metallurgy or some other tool-steel problem troubling you—again, your distributor is at your beck and call. He's a real friend. They don't come any better. It will pay you to get to know him.

BETHLEHEM STEEL

DIGEST OF THE WEEK IN METALWORKING

February 16, 1956—Vol. 177, No. 7

The IRON AGE

Digest Of The Week In Metalworking

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NEWS DEVELOPMENTS

WHO IS WINNING WORLD STEEL RACE? P. 64

U. S. and Free world are far in front in tonnage. But Russia and Red Bloc are making biggest percentage gains. Fact is that most U. S. steel goes to raising standard of living while Red production goes to defense or wherever Kremlin dictates. Editor-in-Chief Tom Campbell analyzes world picture.

NEW LAB MEASURES TO THE MILLIONTHS P. 68

Sheffield facility duplicates U. S. Bureau of Standards facilities to measure and certify accuracy of master gage blocks and the like. Will certify accuracy of one-millionth in. The $250,000 laboratory is also a defense asset.

WILL SECOND CAR BE LARGE OR SMALL? P. 76

Big question in second car trend is whether it will be full-sized auto or smaller car for utility purposes. American Motors virtually bets future on Rambler. Big three debates move.

CAPITOL CLEARS THE WAY FOR MISSILE PUSH P. 81

Feeling in Washington is that the Pentagon has definite word on Red guided missile progress. Observers say Congress has been quietly advised of the danger, that the military have the go-ahead on crash programs.

AIRCRAFT PARTS GET RIGID TESTING P. 85

Before today's components for tomorrow's aircraft get the final O.K., they're given punishing tests at the factory. Minute run-down checks include high-altitude performance inspections, temperature, vibration, and metal corrosion tests.

HIGH frequency electric tool of Chicago Pneumatic Tool Co. does fast job in production finishing. Special cycle models are just one product of sharp market battle between power tool makers.—See P. 61 for story.

WHAT'S LATEST ON DEFENSE TOOLING? P. 87

New plan calls for services to get own funds. Tool buying for defense may actually be stepped up. Vance plan will not be sabotaged by new "buy and use" program. Each service branch will have chance to ask for own tooling funds each year. Builders give general approval.

FEATURE ARTICLES

ABRASIVE WHEELS SIMPLIFY BILLET CUTTING P. 99

In billet form, some of the super-tough steel alloys aren't easy to cut into shorter lengths. Burning doesn't always give the required smooth-cut surface. Saw blades often find the going too slow for top production economy. One plant has adopted modern abrasive cut-off machines.

QUICK TEST CHECKS ALUMINUM COATINGS P. 102

Quality control, cost considerations in the manufacture of aluminized steel products makes a quick, reliable means for checking uniformity and thickness of coatings desirable. A simple-to-operate dip test has now been developed for this need. Technique is similar to the Preece test, but required development of a new solution formulation.

IS BRONZE PLATING YOUR NEXT STEP? P. 104

Bronze plating's golden hues have a twin appeal for metal finishers. They offer a promising solution to the nickel shortage as well as a bright new finish for customers' tired eyes. Under chromium, these copper-tin deposits are said to be more corrosion-resistant than copper. Plating goes on fast, and throwing power of the bath is excellent.

RESISTANCE HEATING UPS FORGING EFFICIENCY P. 108

Flanged rear-wheel axles for motor vehicles are being forged by a German firm with modern upsetting machines, friction forging presses, after parts are heated by electrical resistance method. Results are improved economy and accuracy, simplified handling, excellent structure. Overheating, underheating are avoided. One or two workers handle entire forging sequence. Power consumption is low.

"COLD WELD" NICKEL ALLOYS FOR ATOM USE P. 111

Metal apparatus in atomic energy plants must perform reliably, often under severe pressures, temperatures, atmospheres. This calls for the best of materials and fabrication. Here's how a "cold" metal arc welding technique insures sound, pore-free joints in a nickel alloy pump.

MARKETS AND PRICES

PLASTICS DESERVE A SECOND LOOK P. 59

Industry is adapting standards and weeding out improper applications. Plastics are getting full attention from metalworking firms. Result is inroads into established metal markets.

STAINLESS SETS FOR ANOTHER BIG YEAR P. 66

Stainless steel output was 1,191,177 net tons last year. This was 40 pct more than in 1954 and well over the previous high in 1953. Producers feel they have made definite market gains, see sales holding in '56.

ALUMINUM TAKES AIM ON OIL COUNTRY P. 67

Producers believe light metal is firmly established in oil producing market. Reynolds and National Supply Co. will market oil country pipe, stock couplers and other parts to supply complete system. Light weight gives speed and ease of handling.

DON'T UNDERESTIMATE STEEL MARKET IN '56 P. 155

It would be a mistake to ease up on steel buying. The market is still strong. There's plenty of demand from domestic and foreign consumers. The first six months are especially critical.

STRIKES STILL DOMINATE COPPER MARKET P. 162

Not a day has passed in 1956 but that the copper industry hasn't been at least threatened with the loss of needed production because of labor difficulties. Outlook is that this situation will continue for awhile.

NEXT WEEK:

HAVE GAMBLERS GOT YOUR PLANT'S NUMBER?

Controversial subject of in-plant gambling gets a candid overhauling next week. How widespread is gambling? Does it really hurt a company? What can you do to stop it? IRON AGE has talked to company, police and civic leaders for answers to these big questions on gambling.

TRANSFER MACHINE MAKES INITIALLY-STRAIGHT CRANKSHAFTS

"Rough machining" doesn't necessarily mean inaccurate work. Example: a four-station automatic transfer unit at Chevrolet does very accurate initial machining on crankshaft forgings, thus helps eliminate costly straightening operations. It also saves considerable handling of parts.

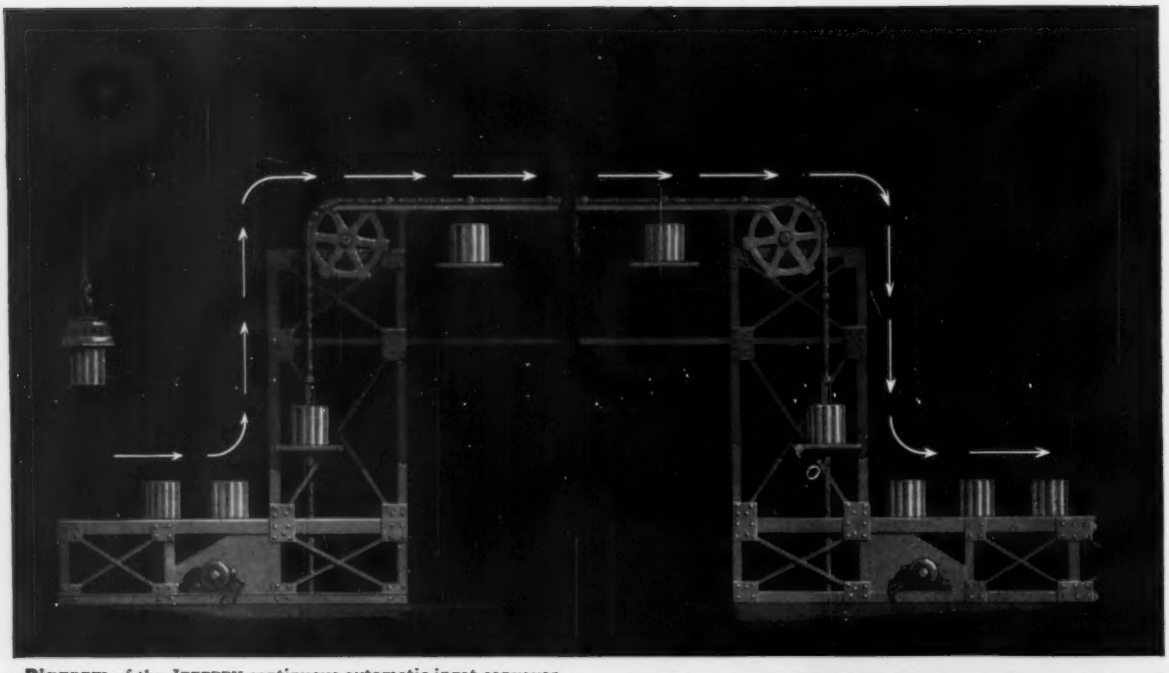
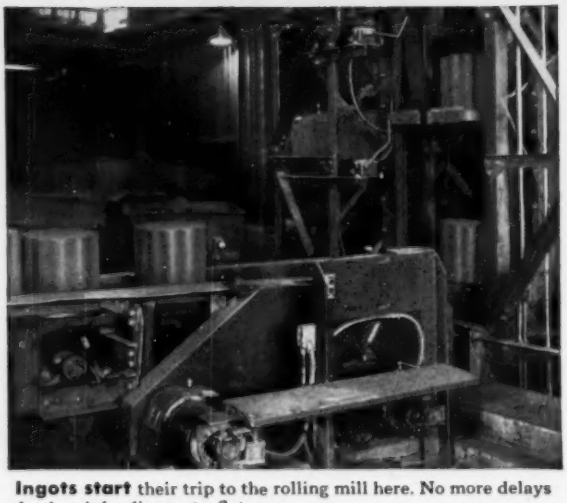


Diagram of the JEFFREY continuous automatic ingot conveyor system at Standard Steel Works Division, Baldwin-Lima-Hamilton Corporation, Burnham, Pennsylvania.

75% saving in handling



Ingots start their trip to the rolling mill here. No more delays for batch-loading onto flat cars.

credited to this JEFFREY Conveyor System

Rising vertically for 20 feet, leveling off to a 25° incline across railroad tracks and a road, horizontally for another 57 feet, then descending to the receiving station—that's the aerial route taken by this JEFFREY conveyor. Transfer time, 3¼ minutes. Distance traveled, 168 feet, compared to a mile when railroad cars were used for this task.

Little labor is required, since a spring-mounted gravity roller conveyor automatically feeds the one-ton ingots to the chain gathering conveyor. The tray conveyor picks them up there and carries them to the rolling mill, where they travel past the weighing station on chain conveyors to the unloading point.

There's considerable saving, too, on badly needed storage space. Ingots move away at a rate of four per minute, so they don't pile up in the open hearth shop.

Write for catalogs containing complete information on JEFFREY handling equipment. The Jeffrey Manufacturing Company, Columbus 16, Ohio.

JEFFREY

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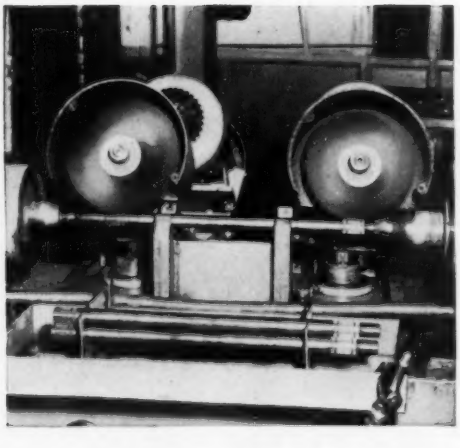
New quality finish gives transmissions longer life

FINE particles of steel, especially burrs, entering complex automatic transmissions cause excessive wear, possible failure.

Automatic, production-line brush finishing equipment, as found in major automotive plants, removes all burrs from precision-fitting transmission parts. In addition, it produces microinch surface finishes never before achieved . . . to increase transmission life.



Transmissions are one of thousands of products whose quality is improved through Osborn's power brush finishing. Yours can be another. Write *The Osborn Manufacturing Company, Dept. F-42, 5401 Hamilton Avenue, Cleveland 14, Ohio.*

Osborn Brushes

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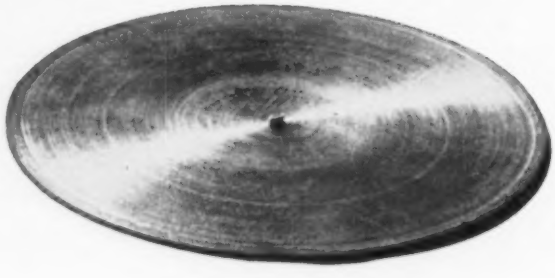
BRUSHING MACHINES • FOUNDRY MOLDING MACHINES

Type 431 Stainless

Armco 17-4 PH



Stainless steel discs hardened to Rockwell C40 to 41 looked like this after heat-treating.

How Armco 17-4 PH Stainless Steel cured these heat-treating headaches

These parts were causing plenty of headaches for heat treat and the rest of the shop until they were made of Armco 17-4 PH Stainless Steel.

High temperatures required to harden grades formerly used caused severe distortion. This meant heat treat was saddled with costly, time-consuming straightening operations—plus the job of removing heavy scale.

Armco 17-4 PH eliminates these shop headaches. Distortion and scaling don't occur because this unusual high strength stainless steel can be fully hardened by heating at only 850 to 900 F for 1 hour and air cooling. With this low-temperature heat treatment, parts remain within tolerances and have only a light heat-tint discoloration.

These cost-cutting advantages also mean that you usually can finish-machine Armco 17-4 PH stainless parts before heat treatment. You don't have to reroute to the machine shop for finishing in the hardened condition.

If you are making hardened parts for corrosion resistant applications, Armco 17-4 PH Stainless Steel may help you cut costs and boost production.

Write us for complete information on this special easy-to-harden stainless steel. It is available in billets, bars and wire. Also ask about Armco 17-7 PH Stainless—produced in sheet, strip, plate, bars and wire.

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Indexed in the Industrial Arts Index and the Engineering Index.

BPA NBP

EDITORIAL

How Prophetic Are Auto Cuts?

◆ IF YOU ARE doing some fancy worrying about the auto cutbacks you should relax a little. They have been given too much attention in their relation to the economy as a whole.

No one should expect auto sales to keep up the pace they did last year. They probably won't. But this sales decline will not be as great as some people anticipate. Nor will the cutbacks have dire effects on the business picture.

There is no question but that the weather has played its part in the auto sales decline from last year's dizzy pace. In many parts of the country the weather has been depressing. Rain, sleet, snow and floods have plagued dealers.

It is true too that credit has reached an all-time high. Many people are waiting until they get off the hook before they buy a new car—but that won't take long. Each minute of the day old contracts are paid off—and new ones are entered into.

What's all this add up to? Late last year automakers filled the dealers' showrooms with units at the same rate 1955 cars were sold. This year's models did not sell that fast. The logical step was to "balance out" car inventories. That's being done now.

Favoring better car sales figures from here on out are: weather, seasonal effects, inventory correction and—later in the year—more money, increased credit and "brand new" 1957 models.

Let's assume auto firms take about 12 pct less steel this year than they did last, though the decline may not be that much. This means the auto industry will "free" about 2.8 pct of this year's steel output. But others are and will continue taking it up. Industrial expansion is at a new high and consumer spending is slated for a rise.

Some of the first people to jump into the steel market in a few months will probably be the automakers. They may have overcut. But you can be sure they will be back in the market for huge tonnages of steel in August and September for 1957 model output.

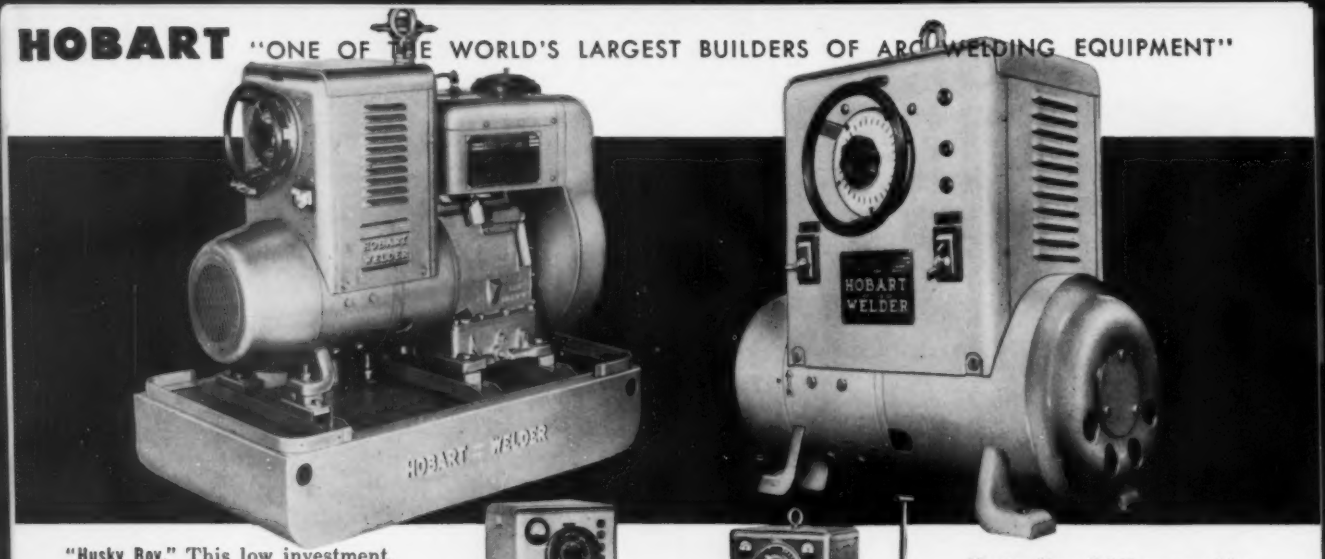
Keep your eyes on the over-all picture. Auto cutback effects on the economy have been exaggerated. They do not forecast "the" decline which some businessmen see in their nightmares.

Confidentially, are you planning to buy a '57?

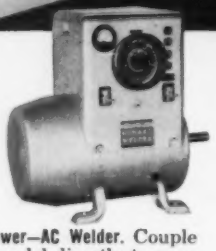
Tom Campbell

EDITOR-IN-CHIEF

HOBART "ONE OF THE WORLD'S LARGEST BUILDERS OF ARC WELDING EQUIPMENT"



"Husky Boy." This low investment, lightweight 200 amp. air-cooled model is perfect for general shop and outside repair work. Easily mounts on truck or trailer. Portable mountings available.

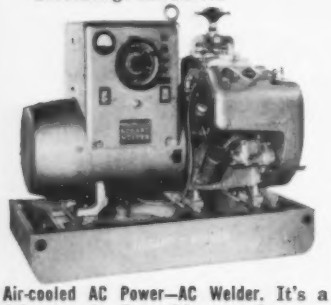


AC Power—AC Welder. Couple this model directly to your gas engine by means of a V-belt or pulley and you can weld or have emergency power when and where you need it on a moment's notice.

Electric Drive. 300 and 400 amp. welders. Ideal for production, maintenance and repair service. Conservative rating lets you do heavy duty welding for limited periods of time.

"Bantam Champ." 250 amp. welder especially designed for light to medium requirements. Popular for all fabrication purposes in the 200 to 250 amp. class.

Transformer Welders. 180 to 500 amp. models for shops that have only single phase power. Exceptional high efficiency and low cost maintenance.

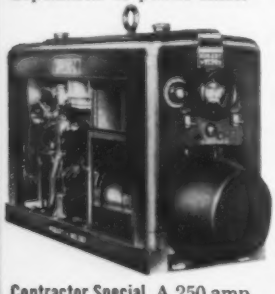


Air-cooled AC Power—AC Welder. It's a 2-in-1 unit. It welds anywhere or supplies power for operating tools, lights, pumps, paint sprays, etc., independent of power lines.

IT PAYS to COMPARE with HOBART for greater welder value!

The best proof of Hobart's superior advantages and values is comparison with other welders. Try a Hobart—you'll see why you get more actual benefits in dollar savings and increased profits because of its higher performance, faster welding and low cost operation.

DC Rectifier. 300 amp. Has three delta connected transformer... magnetic line switch... overload protection, plus remote control.



Contractor Special. A 250 amp. gas drive model that has plenty of engine power and a hot, fast, dependable arc.

Gas Engine Welders with 1 or 3 KW DC, or 6 or 12 KW AC auxiliary power. 200 to 600 amp. models for speedy, low cost welding in the field where electric power is not available.

Generator Only. 200 or 300 amp. with 1 KW 110 volt DC power outlet for "Building Your Own." Just couple it direct or V-belt it to a good gasoline engine.

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A simple comparison will prove Hobart's superior, top quality welding—in every application. You'll be surprised at the real difference in Welding Electrodes. Get the extra speed that means lower production costs—Try Hobart.

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dear editor:

letters from readers

Dispersal

Sir:

I would like to acknowledge and thank you for forwarding the article on "Dispersal: Where's the Incentive" in the January 19, 1956, issue of THE IRON AGE.

We are glad to have the benefit of the views set forth in this article, and I would appreciate receiving any future information which you may make available.

If you still have additional copies of this article available as you indicate in your letter, a few extra copies would be appreciated. *H. J. Warren, Clerk & Counsel, Joint Congressional Committee on Defense Production, Washington, D. C.*

Stainless Dollar

CONGRATULATIONS ON EXCELLENT STORY HOW TO GET MORE FOR YOUR STAINLESS STEEL DOLLAR. NEED 100 COPIES RIGHT AWAY — *T. S. FITCH, PRESIDENT, WASHINGTON STEEL CORP., WASHINGTON, PA.*

Sir:

The article "How to Get More for Your Stainless Steel Dollar" appearing in the February 2, 1956, issue, Vol. 177, No. 5, is extremely interesting. We would like to distribute copies to our sales personnel. Would it be possible to obtain approximately 60 copies of this article? *G. S. Thompson, President, Misco Fabricators, Inc., Detroit.*

Sir:

Please send me a copy of the article "How to Get More for Your Stainless Steel Dollar" which appeared in your February 2, 1956, issue. Congratulations on a job well done. *J. J. Brenza, Staff Metallurgist, Metal Products Div., Koppers Co., Inc., Baltimore, Md.*

Financial Analysis

Sir:

I have been regularly receiving and have always found a great deal of valuable data in your "The Iron Age Financial Analysis of the Steel Industry" which is a yearly report. The last report I have in my files is 1953-1952 and I am wondering if a copy of this report for 1954-1953, which you published on April 8, 1954, is the last issue. I would have reasons for believing that during April, 1955, this particular report was released and as already indicated in this letter, I would very much appreciate having a copy of the latest issue.

I should like to inquire as to whether you will have another report available in April, 1956.

This particular financial analysis contains a wealth of information and I am extremely desirous of having my files complete with respect to previous issues. *R. E. McCormack, Manager - Metal Sales, Mining and Smelting Div., The Eagle-Picher Co., Miami, Okla.*

The 1955-1954 analysis will appear in one of our April issues this year.—Ed.

Billet Cutter

Sir:

On page 29 of the January 12, 1956, issue of THE IRON AGE there is a description of a new billet cutter, i.e., "New high-speed abrasive cut-off machines are turning in remarkable production records in cutting off billets. One such machine sliced through a 12-in. alloy steel billet 60 times faster than existing equipment."

We would be pleased to get the name of the company that manufactures this machine and all the information you have on it. *M. E. Hamilton, Gary Works Library, United States Steel Corp., Gary, Ind.*

See p. 263 this issue.—Ed.

Even the smallest size Reamers are Standard with L&I

The Reamer Specialists

LAVALLEE & IDE, INC.

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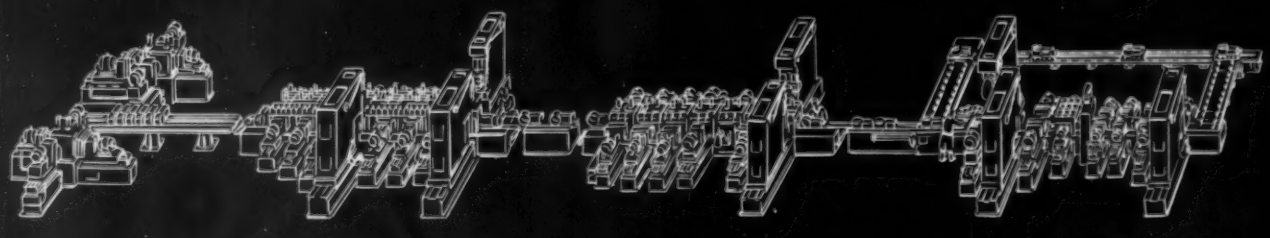
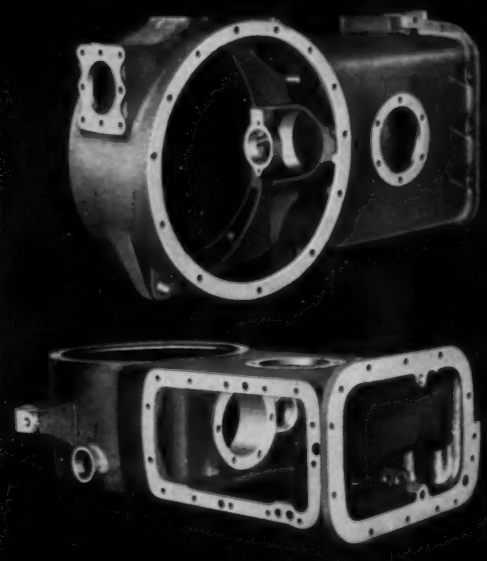
Tractor Differential Housings from Rough Castings to Assembly!

Another Transfer-matic by Cross



The new Cross Special Machine above is one of four sections which constitute a complete production line. Together, they process 46 tractor differential housings per hour from rough foundry castings to assembly. The line is 225 feet long with 31 stations. It performs 313 operations, including 19 milling, 7 cross-facing, 110 drilling, 17 boring, 72 chamfering, 4 spot-facing, 8 reaming and 76 tapping.

Like all Cross machines, the parts—even tooling details—are made to interchangeable tolerances for fast, easy maintenance and to provide flexibility for model changes—an important Cross advantage both from the standpoint of operating costs and investment. This production line is another example of Cross Sectionized (Segmented) Automation.



Established 1898

THE CROSS CO.

First in Automation

DETROIT 7, MICHIGAN

fatigue cracks

by William M. Coffey

Donnez-moi la plume—*De Gaulle*

Over the weekend and far into the past few nights, we have been doing some figuring.[1] One of those intellectual[2] girls who always works for some foundation or some semi-quasi govt. agency studying the rising population of the pygmy or something asked us one time what we did and we said we work with IRON AGE[3] and she said, "Oh, yes, that's the magazine with all the ads but nothing to read" and we felt a little nauseated and left.

. . . this isn't the type we refer to

But we got to thinking about this remark and over the weekend and far into the past few nights[4] we figured up for the benefit of such intellectuals everywhere just how much editorial matter THE IRON AGE managed to print last year in 52 issues. We were staggered. We carried a total of 3646 pages of editorial matter, which included 52 pages of Fatigue Cracks alone![5] This is equal to a volume over 6 inches thick weighing in at something like 21 lbs[6] and that is a lot of book.

About 2700 pages (including 52 pages of Fatigue Cracks alone) represented up-to-the-minute reporting on industry news, markets and prices; 983 pages were devoted to feature technical articles. Of these, 135 pages covered machining and machine tools; 143 covered metal finishing; 94 for heat treating; 73 for metallurgy; 50 for foundry; 65 for stamping, forming, etc.; 65 for welding; 52 for steelmaking; 68 for testing, instrumentation; the rest were spread over powder metallurgy, power transmission, fabricating, forging, materials handling and many more. It is very interesting to note that 79 pages were on non-ferrous.

Incidentally the ratio to which the young lady was referring is two to one. One page of editorial matter to two of advertising.

Puzzlers

All we were trying to prove with the dog-chain-tree puzzler was that a staple hammered in a tree doesn't move up or out as the tree grows, so the distance remains the same from the tree to the dog, 75.08 ft. To heck with whether or not the links expand or contract or the dog's neck gets bigger, etc. Winners: C. W. McKinley; Arlan Walker, Iowa Ordnance Plant; Walter Snyder, Lee Metal Products Co.; the Collins Radio Puzzle Club; John Schroeder; J. M. Freed, Wicaco Machine Corp.; Ed Eckhardt, Fischer & Porter Co.; Sarie and the GSCC and Nels Johnson, Wireryte, Inc.

---

[1] *we really didn't, of course, but fire one for effect, anyway*

[2] *one who is educated beyond his/her intelligence (ibid, ref 2.34)*

[3] *one doesn't work for* IRON AGE. *We all work with each other (ed)*

[4] *fire two*

[5] *fire three*

[6] *Fatigue Cracks weighs pretty close to half lb.*

1941 — 1956

As TMI passes another important milestone in the precision service of American Industry, the successes of our yesteryears indicate new and even greater recognition for this familiar symbol:

The Mark of Quality TMI

CEILING UNLIMITED

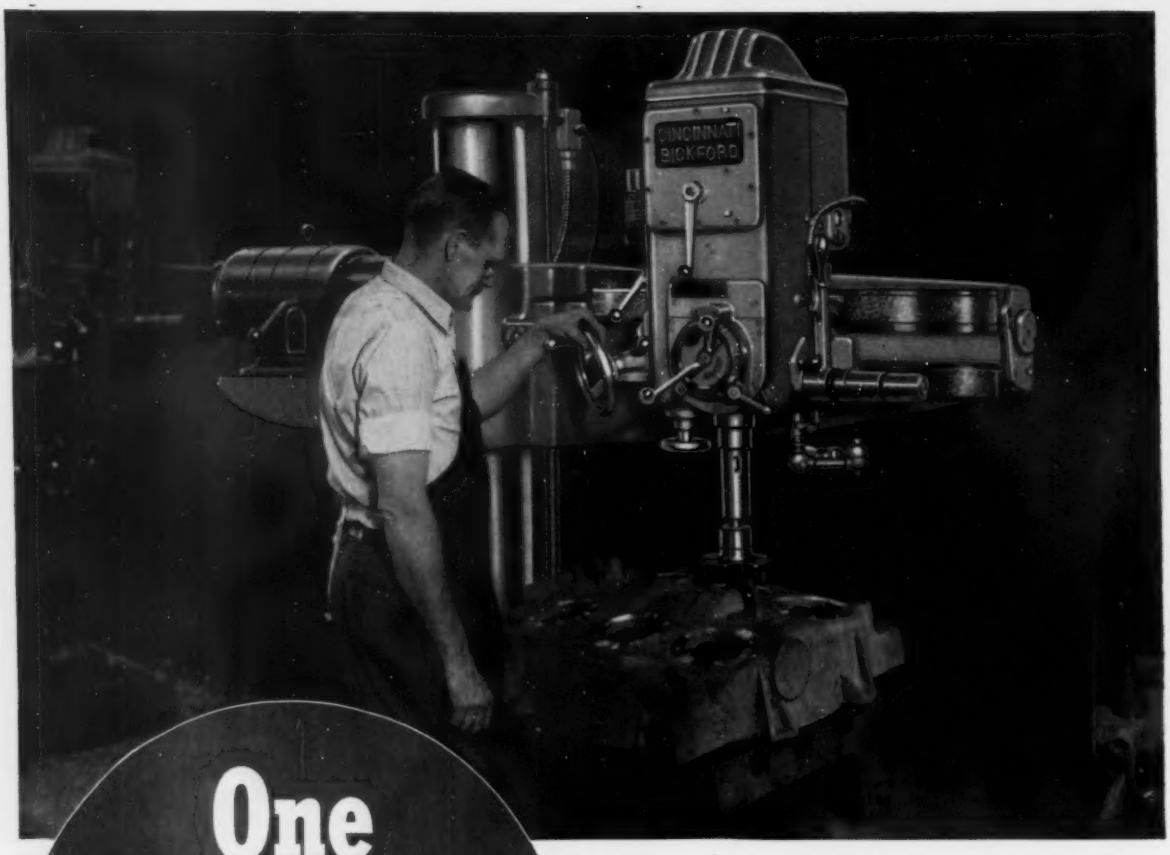
Design and research engineers' ultra-performance demands on stainless steel and alloy tubing require a "ceiling unlimited" on our ability to produce it to almost infinite precision tolerances. That means no limit to experience or equipment capacity to fuse the characteristics of these metals with cold drawing processes required to attain the delicate sizing and shaping by the new industrial age of supersonic flying, absolute automation, atomic power, advanced plastics, etc.

SMALL DIAMETER STAINLESS STEEL AND ALLOY TUBING FOR TOP FLIGHT APPLICATIONS

We specialize in small diameters, .050" to .625" O.D., in tolerances as close as .001", in perfect finishes, inside and outside. And: in solving tubing problems! Your inquiries are always welcome and receive prompt attention.

TUBE METHODS INC. METALLURGISTS ENGINEERS • MANUFACTURERS

BRIDGEPORT Montgomery County, Pa.



One set-up saves 30%

Photos courtesy of the Kelman Electric & Mfg. Company, Los Angeles, California.

Boring, facing, and high speed drilling with one set-up cut the floor to floor time about one-third on this job.

The Kelman Electric & Mfg. Company say their Cincinnati Super Service Radial Drill "handles easily, is very accurate and versatile."

They are facing 6″ diameters; drilling for ½″ bottom tap, and tapping with a ½″ bottom tap on this job.

The part being processed is a Bronze Top Casting.

Cincinnati Super Service Radial Drills are profit makers in this shop, and they could be in yours.

Write for Bulletin R-21C

CINCINNATI BICKFORD

RADIAL AND UPRIGHT DRILLING MACHINES

CINCINNATI BICKFORD DIVISION

Cincinnati 9, Ohio, U.S.A.

GIDDINGS & LEWIS MACHINE TOOL CO. : Fond Du Lac, Wisconsin

dates to remember

FEBRUARY

INSTITUTE OF SURPLUS DEALERS, INC.—11th annual trade show and convention, Feb. 19-21, 212th AAA Armory, N. Y. Society headquarters, 673 Broadway, N. Y.

AMERICAN INSTITUTE OF MINING & METALLURGICAL ENGINEERS—Annual meeting, Feb. 19-23, Hotels Statler and New Yorker, N. Y. Society headquarters, 155 E. 44th St., N. Y.

ASSN. OF IRON & STEEL ENGINEERS —Annual West Coast meeting, Feb. 20-22, Hotel Statler, Los Angeles. Society headquarters, 1010 Empire Bldg., Pittsburgh.

EXPOSITIONS

ASTE—Industrial exposition, March 19-23, Chicago.

MATERIALS HANDLING SHOW, June 5-8, Cleveland.

ASSN. OF IRON & STEEL ENGINEERS, Sept. 25-28, Cleveland.

METAL SHOW—Oct. 8-12, Cleveland.

MARCH

NATIONAL ASSN. OF WASTE MATERIAL DEALERS, INC.—43rd annual convention, March 11-13, Waldorf-Astoria Hotel, New York. Society headquarters, 271 Madison Ave, New York 16.

NATIONAL ASSN. OF CORROSION ENGINEERS — National conference and exhibition, March 12-16, Hotel Statler, N. Y. Society headquarters, 155 E. 44th St., N. Y.

PRESSED METAL INSTITUTE—Annual spring technical meeting, March 14-16, Hotel Carter, Cleveland. Society headquarters, 3673 Lee Rd., Cleveland.

STEEL FOUNDERS' SOCIETY OF AMERICA — Annual meeting, March 19-20, Drake Hotel, Chicago. Society headquarters, 606 Terminal Tower, Cleveland.

APRIL

MATERIAL HANDLING INSTITUTE—Spring meeting, April 3, Edgewater Beach Hotel, Chicago. Society headquarters, 813 Clark Bldg., Pittsburgh.

AMERICAN INSTITUTE OF STEEL CONSTRUCTION, INC.—Annual spring engineering conference, April 4-6, Lehigh University, Bethlehem, Pa. Society headquarters, 101 Park Ave., New York.

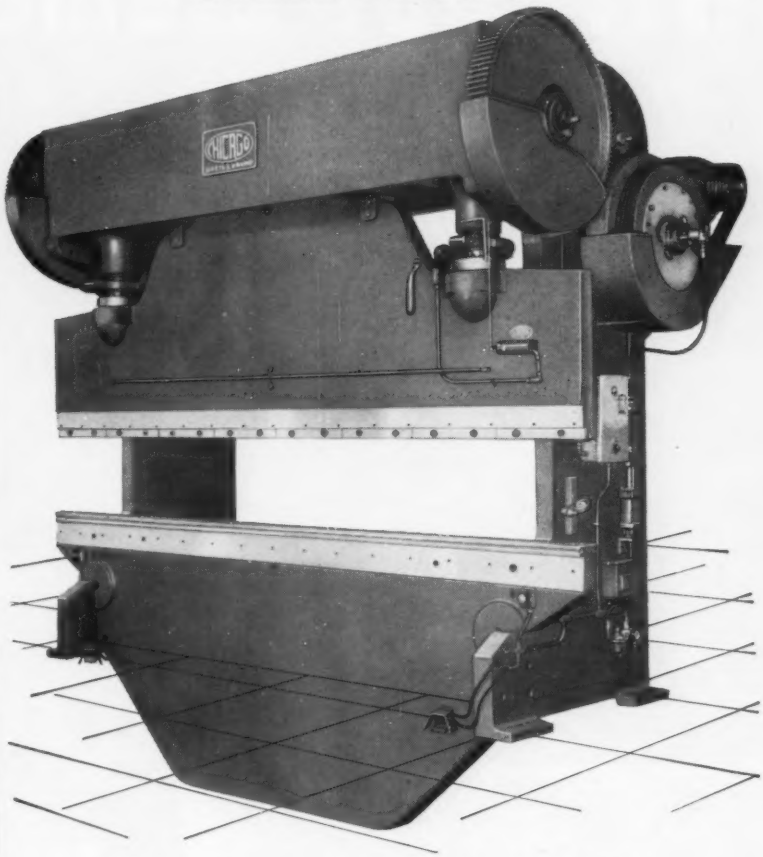
AMERICAN SOCIETY OF LUBRICATION ENGINEERS — Annual meeting and lubrication exhibit, April 4-6, William Penn Hotel, Pittsburgh. Society headquarters, 84 E. Randolph St., Chicago.

METAL POWDER ASSN. — 12th annual meeting, April 10-12, Cleveland Hotel, Cleveland. Society headquarters, 420 Lexington Ave., New York.

CHICAGO DREIS & KRUMP

Press Brakes

FOR BENDING • FORMING STEEL PLATES



The most modern design throughout with all the features for the fastest bending and forming of steel plates. Large variety of standard sizes and capacities. Also modified designs for special production work.

Complete Engineering Recommendations for Any Job on Request 6160

CHICAGO DREIS & KRUMP

Press Brakes • Straight-Side Presses • Press Brake Dies

Hand and Power Brakes • Special Metal-Forming Machines

DREIS & KRUMP MANUFACTURING CO.

7430 South Loomis Boulevard, Chicago 36, Illinois

Yes YOU CAN sharpen carbides WITHOUT diamonds

BIG ATTENTION-GETTER at the MACHINE TOOL SHOW

These men in the huddle are watching Ex-Cell-O's new METHOD X MACHINE—many of whom actually sharpened tools on the machine—and all were impressed by the process that eliminates the diamond wheel in sharpening carbides.

- The "grinding wheel" is simply a cast-iron disc.
- It does both roughing and finishing.
- It cuts carbides and steel at the same time.
- *Cuts any material that's an electric conductor!*

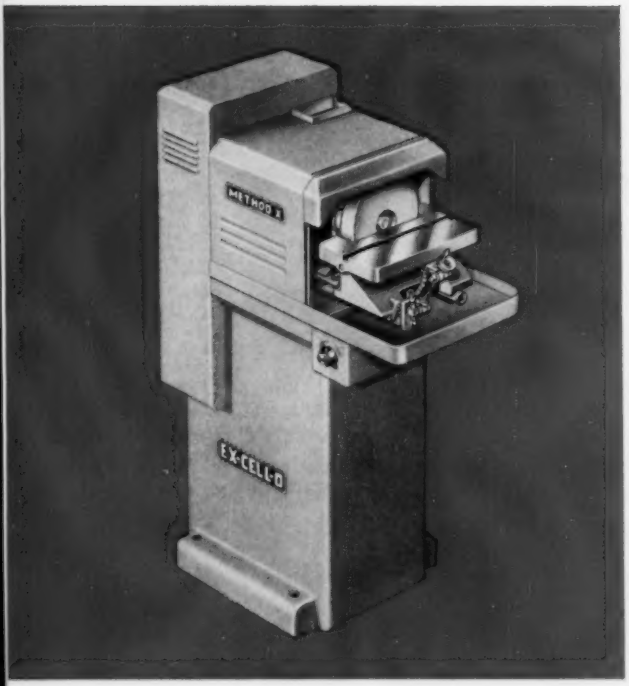
EX-CELL-O Method X TOOL SHARPENER

lengthens the life of your CARBIDE TOOLS because this process leaves

- NO heat checks—
- NO grinding cracks—
- NO saw-tooth cutting edges

EX-CELL-O Method X TOOL SHARPENER

You save the cost of your Method X Machine *over and over,* because you use *no diamonds*



EX-CELL-O METHOD X TOOL SHARPENER has an Ex-Cell-O Precision Spindle with inbuilt motor that rotates the 10-inch cast-iron disc. The tool-rest table is of ample size to support large tools firmly. The protractor plate indicates setting in degrees . . . No coolant is needed in the sharpening process.

Ex-Cell-O's Method X is an electromechanical process, sometimes called electro-spark erosion, for off-hand sharpening of single-point tools. A current source has its positive terminal connected to the tool to be sharpened (which is at ground potential) and the negative terminal is connected through the mounting flange to an iron disc. A semi-solid dielectric or insulating film is applied to the disc to provide a spark gap. As the tool is oscillated across the disc, current pulsations jump across the spark gap, dislodging particles from the workpiece.

Method X produces a non-directional matte finish, the coarseness of the texture (and cutting speed) depending on the power selected. In the power unit, the electrical energy is stored for an instant, then quickly discharged. There are two cutting rates, selected by positioning a switch. The machine electric control is built to NMTBA and JIC standards.

Phone your local Ex-Cell-O representative — or phone, wire or write Ex-Cell-O in Detroit for all the facts about METHOD X.

Method X off-hand tool sharpening is much like conventional grinding. Cutting speeds for carbides are comparable with those for grinding with diamond wheels. Your operators with experience in conventional grinding can change to the Method X process with brief instruction.

EX-CELL-O
CORPORATION

DETROIT 32, MICHIGAN

MANUFACTURERS OF PRECISION MACHINE TOOLS • GRINDING SPINDLES
CUTTING TOOLS • RAILROAD PINS AND BUSHINGS • DRILL JIG BUSHINGS
AIRCRAFT AND MISCELLANEOUS PRODUCTION PARTS • DAIRY EQUIPMENT

56-1

Leading a Dog's Life..?

ARE YOU IN THE DOG HOUSE BECAUSE OF GRINDING WHEEL PROBLEMS? Then switch to CINCINNATI (PD) WHEELS. For *now* CINCINNATI Grinding Wheels offer POSITIVE DUPLICATION—a remarkable achievement in precision manufacturing and quality control that can *save you money . . . and increase your production.*

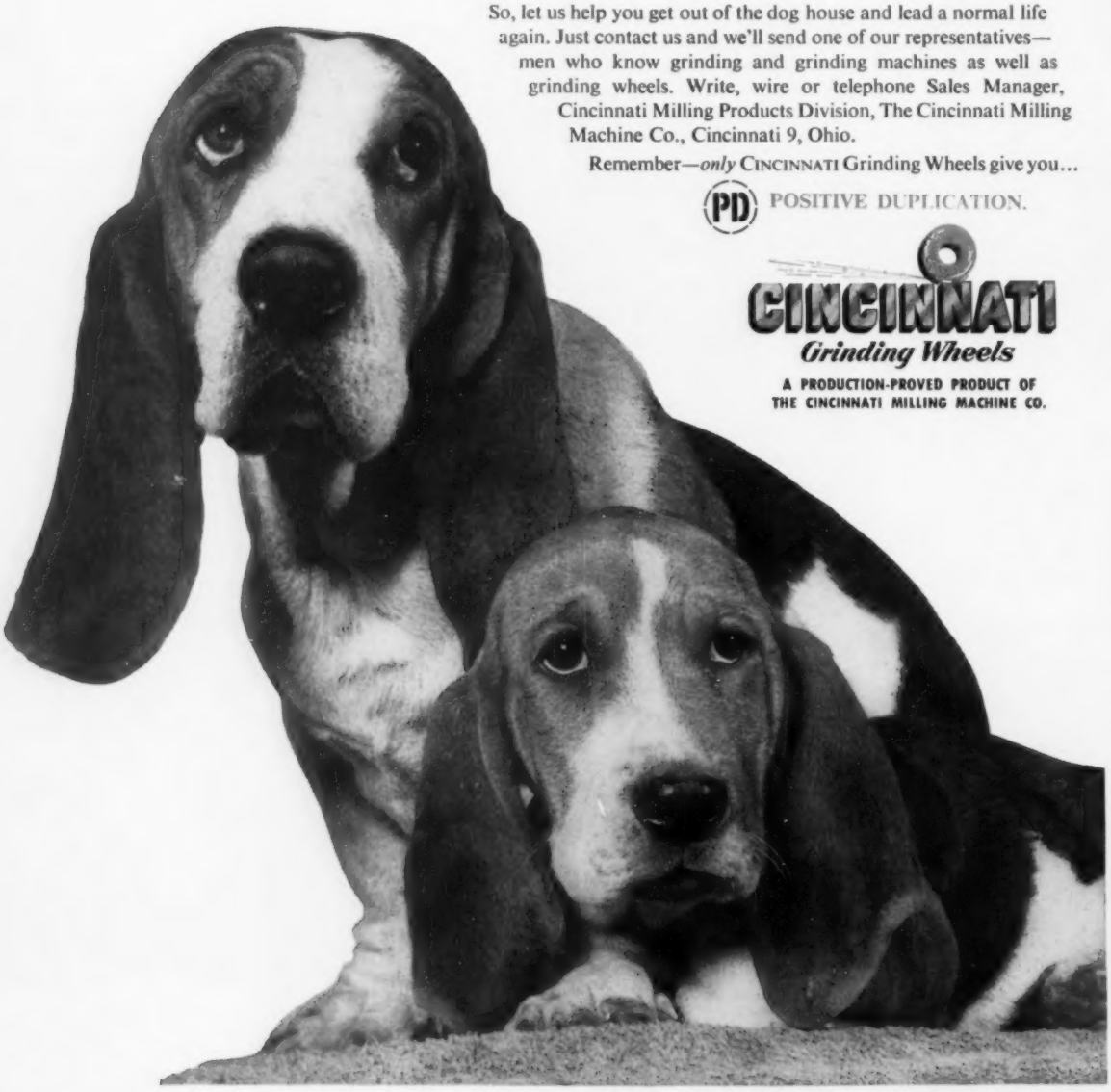
Here's how CINCINNATI (PD) WHEELS can put a twinkle in your eyes and a smile on your face: through the CINCINNATI (PD) Manufacturing Process you are assured Positive Duplication of the original wheel *every* time you reorder. "On grade" with a CINCINNATI (PD) WHEEL means all future (PD) WHEELS will act and grind exactly alike.

Yet CINCINNATI (PD) WHEELS are priced no higher than ordinary wheels.

So, let us help you get out of the dog house and lead a normal life again. Just contact us and we'll send one of our representatives—men who know grinding and grinding machines as well as grinding wheels. Write, wire or telephone Sales Manager, Cincinnati Milling Products Division, The Cincinnati Milling Machine Co., Cincinnati 9, Ohio.

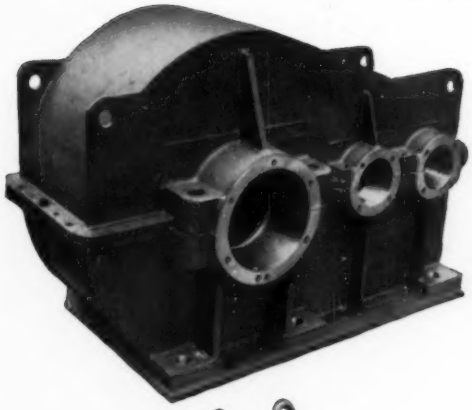
Remember—*only* CINCINNATI Grinding Wheels give you...

(PD) POSITIVE DUPLICATION.

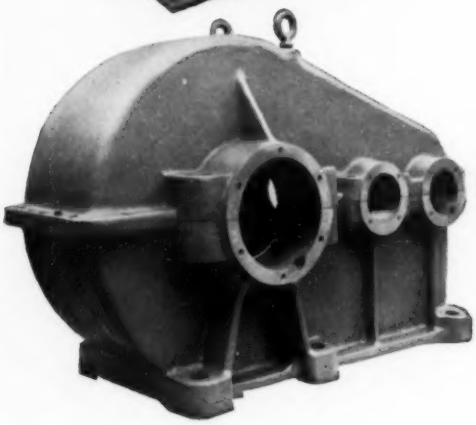


CINCINNATI
Grinding Wheels
A PRODUCTION-PROVED PRODUCT OF
THE CINCINNATI MILLING MACHINE CO.

Case History No. 32 • SPEED REDUCER HOUSING



69 FABRICATED PARTS



2 GRAY IRON CASTINGS

Plus **. . . 73% saving on cost of unmachined pieces.**

Plus **. . . 20% saving on machining cost.**

The performance of the Gray Iron casting is superior to the assembly, because of Gray Iron's ability to absorb vibration. Furthermore, this characteristic provides the added dividend of quieter operation. Savings on the first three units made up the difference between pattern costs and template costs.

Look at the two housings. Consider appearance plus savings. Can there be any question about which is the better buy!

Somewhere in your plant, there must be a place where use of Gray Iron will save you money and improve your product.

For specific technical and business information, write direct to Gray Iron Founders' Society, Inc., National City—East 6th Building, Cleveland 14, Ohio.

This symbol assures you the most for your casting dollar

Here's why it pays to call in one of the more than 500 leading foundries displaying the Society symbol:

- The most recent technical and business information is available to each member through the Society to help you design better products at lower cost.
- The use of sound cost accounting procedures is recommended and encouraged among Society member foundries, assuring full value for your casting dollar.
- Improved castings result from the advanced techniques and the high sense of responsibility of Society members.

MAKE IT BETTER WITH GRAY IRON

GRAY IRON FOUNDERS' SOCIETY

SOME OF THE REASONS YOU GET BETTER SERVICE WITH KAISER PERICLASE-CHROME BRICK:

1. Low permanent growth from iron-oxide attack minimizes end wall buckling and spalling.
2. A ceramic bond is formed before the chemical bond is destroyed.
3. No liquid phase in forming its ceramic bond. Volume stability.
4. High MgO content in end wall brick provides greater resistance to carryover erosion and iron oxide attack.
5. Lowest porosity minimizes alteration by resisting penetration of gases and impurities.

CHEMICALS
KAISER
REFRACTORIES

Expansion tests show why you get SUPERIOR END WALL SERVICE with Kaiser Periclase-Chrome Brick

ONE REASON why Kaiser Periclase-Chrome Brick assures better end wall service for many leading steel producers is shown by this laboratory test of the effect of steel plates on permanent growth.

In this test, pre-fired 9x4½x3" bricks of two types were compared: brick having a chrome-magnesite ratio of approximately 75 to 25, and Kaiser Periclase-Chrome Brick.

Both types of brick were laid up as headers, forming the side walls of a tangentially fired pot furnace. 16-gauge steel plates were applied to the four sides of the bricks. The bricks were set loosely, with only 4 courses of brick overlaying the test pieces.

The effects produced in the laboratory were the result *solely of the heating and iron oxide reaction.* Heating and atmosphere conditions were identical on each type of brick. The furnace was heated with gas to 3100°F. ± 25°, and held at this temperature for 16 hours. Heating and cooling was at the rate of 75°F. per hour to minimize thermal spalling effects.

Results of the test

After cooling, the bricks were separated and photographed. (See picture.) Note strings stretched from top corners of new brick on ends of each row. Comparative growth on hot faces of brick shows above strings. The upper row of brick is the chrome-magnesite type. The maximum linear cold expansion of these bricks was 1" or 11%, with an average of 9%.

The lower row of bricks are Kaiser Periclase-Chrome. The maximum linear cold expansion of the Kaiser brick was only $\frac{3}{16}$" or 2.1%, with an average of only 1.4%.

These values are in addition to the reversible thermal expansion, in each case.

Also, note in the picture the cracking of the chrome-magnesite type brick caused by the relatively great iron-oxide swelling. The Kaiser Periclase-Chrome Brick is free from such cracks.

The superiority of Kaiser Periclase-Chrome Brick

This test indicates only one of many reasons why Kaiser Periclase-Chrome Brick gives hearth operators better end wall service.

The special composition of Kaiser Periclase-Chrome Brick assures less spalling, less swelling, greater resistance to abrasion and alteration by oxide and slag. This superior brick can greatly increase end wall life or greatly reduce wall thickness to cut costs, when end wall service is balanced.

Call or write any of the sales offices listed below for immediate attention to your end wall particular problems.

Call or write Kaiser Chemicals Division, *Kaiser Aluminum & Chemical Sales, Inc. Regional Sales Offices: 1924 Broadway,* OAKLAND *12, Calif. . . . 3 Gateway Center,* PITTSBURGH, *Pa. . . . 518 Calumet Building, 5231 Hohman Ave., Hammond, Indiana* (CHICAGO).

Kaiser Chemicals

Pioneers in Modern Basic Refractories

REFRACTORY BRICK • RAMMING MATERIALS • CASTABLES & MORTARS • MAGNESITE • PERICLASE • DEADBURNED DOLOMITE

Kaiser PERICLASE Brick for the Steel Industry:

- Periclase Brick (D-S)
- Periclase Chrome Brick
- Chrome Periclase Brick

small-unit packaging simplifies use and handling of

STAINLESS STEEL SAFETY LOCK WIRE

The availability of stainless steel safety lock wire on 1, 5 and 10-pound disposable spools is good news to manufacturers and service organizations in the aircraft, automotive and machinery industries—or wherever safety lock wire is required.

These small-unit spools—now offered for the first time by National-Standard—are expected to simplify many manufacturing and servicing operations, ranging from extensive use of the handy 1-pound hip pocket or toolbox spools in non-localized work, to bench or production uses for the larger spools.

In addition to spools of the 3 capacities, National-Standard offers the lock wire in a complete range of sizes, from 0.020 to 0.067-inch and in five different government specifications: QQ-W-423; AN-W-23; AN-W-24; MIL-W-6713 and AMS-5685-C.

Spools of all three sizes can be mounted on "let-off" spindles and are clearly labeled as to type and size of wire. The 1-pound spools are plastic, the larger spools metal.

NS
NATIONAL-STANDARD Company
NILES, MICHIGAN

NATIONAL-STANDARD COMPANY • NILES, MICHIGAN
Tire Wire, Stainless, Fabricated Braids and Tape

ATHENIA STEEL DIVISION • CLIFTON, N. J.
Flat, High Carbon, Cold Rolled Spring Steel

REYNOLDS WIRE DIVISION • DIXON, ILLINOIS
Industrial Wire Cloth

WAGNER LITHO MACHINERY DIVISION • JERSEY CITY, N. J.
Special Machinery for Metal Decorating

WORCESTER WIRE WORKS DIVISION • WORCESTER, MASS.
Round and Shaped Steel Wire, Small Sizes

THERE'S A
COMPLETE LINE OF ROEBLING

Galvanized

ROEBLING is a specialist in galvanizing with practically unmatched facilities for producing galvanized wire in enormous quantities and in complete size ranges. Hot galvanized is available in sizes from .283″ to .035″... Roegal (drawn galvanized) from .187″ to .005″.

And Roebling galvanized wire can be packaged in the way most convenient and economical for you... in coil diameters of 60″, 30″, 22″, 16″ and 8″... on reels, spools or handy spoolless cores.

You *pay* for the best when you buy galvanized wire. Make sure you *get* it—specify Roebling! John A. Roebling's Sons Corporation, Trenton 2, New Jersey.

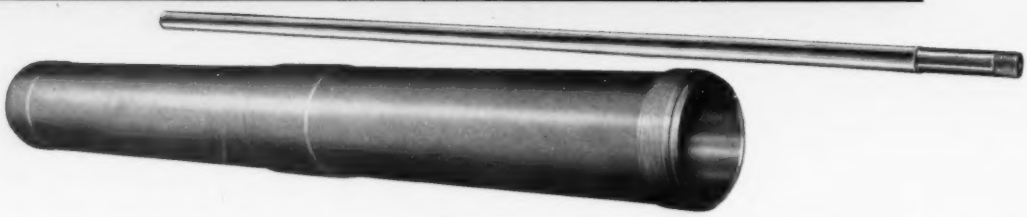
ROEBLING

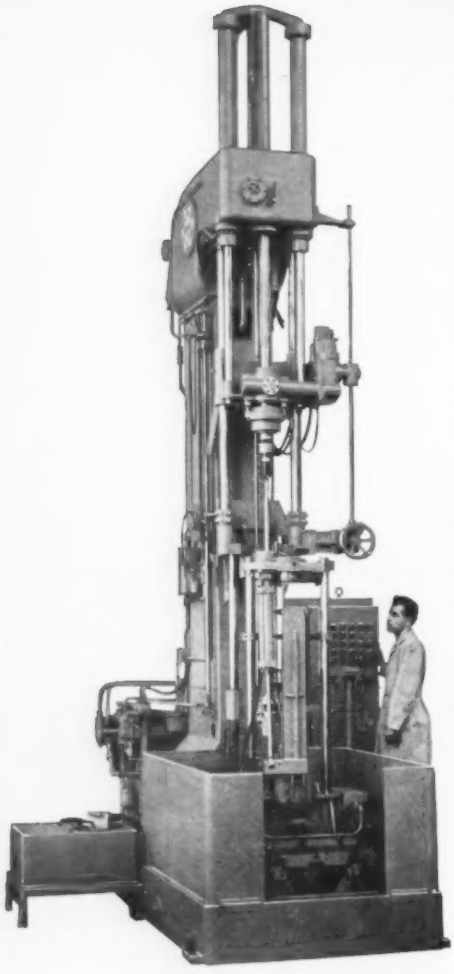
Subsidiary of The Colorado Fuel and Iron Corporation

ATLANTA, 934 AVON AVE. • BOSTON, 51 SLEEPER ST. & 5 PITTSBURGH ST. • CHICAGO, 5525 W. ROOSEVELT RD. • CINCINNATI, 3253 FREDONIA AVE. • CLEVELAND, 13225 LAKEWOOD HEIGHTS BLVD. • DENVER, 4801 JACKSON ST. • DETROIT, 915 FISHER BLDG. • HOUSTON, 6216 NAVIGATION BLVD. • LOS ANGELES, 5340 E. HARBOR ST. • NEW YORK, 19 RECTOR ST. • ODESSA, TEXAS, 1930 E. 2ND ST. • PHILADELPHIA, 230 VINE ST. • ROCHESTER, 1 FLINT ST. • SAN FRANCISCO, 1740 17TH ST. • SEATTLE, 900 1ST AVE. S. • ST. LOUIS, 3001 DELMAR BLVD. • TULSA, 321 N. CHEYENNE ST. • EXPORT SALES OFFICE, 19 RECTOR ST., NEW YORK

MICROHONING*...

Efficient Stock Removal
with
LOW-VELOCITY ABRADING





INCREASINGLY, process engineers are recognizing Microhoning's low-velocity abrading technique as a means of combining efficient stock removal with precision.

The Brooklyn Works of American Machine & Foundry Company, in the precision-manufacture of recoil mechanisms for artillery weapons, required a process that would most efficiently remove substantial amounts of stock and generate functional surface characteristics on the I.D. of recoil cylinders and O.D. of piston rods. After extensive study of available methods, AMF selected Microhoning as the most productive and economical process for obtaining desired results.

The floating piston in the recoil cylinder has nitrogen gas on one side and hydraulic oil on the other. Because silver ring seals are used, any error in geometry or roughness of cylinder or rod surfaces will induce deformation or scoring of silver rings and break these important seals.

The largest cylinder processed by AMF to date is for a 75 mm gun and has a bore diameter of 4.750 inches and a length of 46 inches. Piston rods for this gun are 1.375 inches in diameter and 56 inches long. Both I.D. and O.D. operations are on the same Microhoning machine—Model 450 Hydrohoner.

The Microhoning process efficiently removes up to .026 inch of stock from cylinders and .006 inch from rods to correct waviness, taper and out-of-roundness. A geometric tolerance of .0001 inch is held while obtaining a 1.5 microinch finish.

Working closely with AMF manufacturing personnel, Micromatic developed fixtures and tooling that minimize changeover time. The fixture for the cylinder is mounted on an indexing table so it is simply indexed away from the spindle while the rod is being Microhoned. You, too, can solve your precision stock-removal problems through application of Microhoning—the low-velocity abrading process.

For further information write for CROSS-HATCH, Vol. 7 No. 5

***MICROHONING =**
Stock Removal + Geometry + Size Control + Surface Finish

MICROMATIC HONE CORPORATION

8100 SCHOOLCRAFT AVENUE • DETROIT 38, MICHIGAN

NOTHING *can equal Stainless Steel*

FOR CORROSION RESISTANCE. The Norwich, N. Y. plant of Norwich Pharmacal Company is a magnificent display of Stainless Steel. Shown here is a Stainless Steel filter, used to separate mother liquor from the solids of furoxone. Here, Stainless outlasts any other practical metal by two to one.

FOR EASY CLEANING. In this textile plant of W. J. Dickey & Sons, Inc., dyeing time *and* costs have been cut 50% with the use of Stainless Steel equipment. When colors are changed, tanks don't have to be boiled out. With its smooth, dense surface, Stainless can be cleaned easily and quickly.

FOR CONSUMER APPEAL. Now, just about every housewife knows what Stainless Steel is. When she sees the Stainless tub in this automatic laundry, made by Speed Queen Corp., Ripon, Wis., she knows that there is nothing to corrode. She knows, too, that the Stainless tub will stay bright and clean and will last forever.

No other design material can match Stainless Steel in its *combination* of desirable properties: corrosion resistance, strength and hardness, beauty, cleanability and easy fabrication. When buying Stainless, remember that United States Steel offers the widest range of types, finishes and sizes available in the United States.

USS STAINLESS STEEL

SHEETS · STRIP · PLATES · BARS · BILLETS · PIPE · TUBES · WIRE · SPECIAL SECTIONS

UNITED STATES STEEL

UNITED STATES STEEL CORPORATION, PITTSBURGH • AMERICAN STEEL & WIRE DIVISION, CLEVELAND • COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO • NATIONAL TUBE DIVISION, PITTSBURGH
TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALABAMA • UNITED STATES STEEL SUPPLY DIVISION, WAREHOUSE DISTRIBUTORS • UNITED STATES STEEL EXPORT COMPANY, NEW YORK

How U. S. Steel's **Robert Blacka** inspects the shaft for America's first full scale atomic power plant

You've read about our nation's first nuclear reactor power plant. It will be operated by Duquesne Light Company at Shippingport, Pa.—near Pittsburgh. Capacity will be a minimum of 60,000 kilowatts, using enriched and natural uranium as fuel, and light water as the moderator.

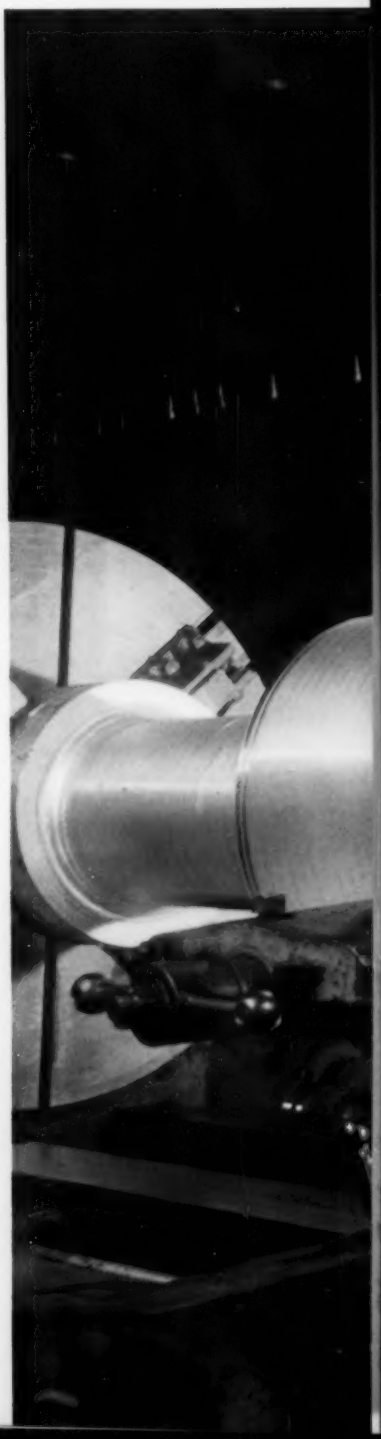
Westinghouse Electric is building the turbine generator. The first turbine shaft that will be installed is the one in the big picture, a USS Quality Forging being sonic-tested by Robert Blacka who has been a United States Steel Inspector for 16 years.

The instrument sends sound waves through the steel. The waves bounce back from the other side, and the entire journey is shown on the oscilloscope tube. Any imperfection in the steel sends a separate "echo" that can be analyzed by a skilled inspector.

Of course, there are other tests: macro-etching and microscopic examination, physical testing of bars to determine strength levels and ductility, magnetic particle and borescope inspection plus others—depending on customer needs.

USS Quality Forgings are very frequently specified when the buyer cannot tolerate the slightest compromise with quality. Part of the reason lies in United States Steel's complete array of test facilities—in the hands of seasoned inspectors who know how to use them.

Write for our free 32-page booklet on USS Quality Forgings. Address United States Steel, Room 5140, 525 William Penn Place, Pittsburgh 30, Pennsylvania.



USS QUALITY FORGINGS

- heavy machinery parts . . . carbon, alloy, stainless
- forged steel rolls and back-up roll sleeves
- electrical and water wheel shafts
- specialty forgings of all types

UNITED STATES STEEL

SEE The United States Steel Hour. It's a full-hour TV program presented every other week by United States Steel. Consult your local newspaper for time and station.

620 lbs. lighter, more portable, and more durable . . .

Welded Assembly of USS "T-1" Steel Cuts Grapples Weight 47%

It isn't the logs that wear out log grapples like these. But dropping the grapples 10, 25, or 30 feet, twice a minute, hour after hour, day after day, does wear them out. They literally destroy themselves. That's why light weight is important. And toughness. And strength.

Mack Welding Company, Duluth, Minnesota, has cut weight of grapples 620 lbs. and simultaneously *increased* durability, just by switching from mild steel to rugged USS "T-1" Steel. Here is what they say about "T-1":

"We thought we had reached the lowest possible weight when we manufactured a previous model weighing 1300 pounds. But these new grapples made from your 'T-1' Steel weigh only 680 pounds—just a little over half as much. That's an important advantage for loggers who have relatively small-capacity truck-mounted cranes. No other rolled steel plate would give us such light weight in grapples capable of handling up to 3 ton loads."

"T-1" WELDS BEAUTIFULLY!

"As far as fabrication is concerned, we find that 'T-1' Steel welds beautifully and can be flame cut in exactly the same way as mild steel, without distortion or any other difficulty. We're very pleased with it."

"T-1" Steel is unique. For it gives you a combination of high tensile and yield strength (105,000 psi and 90,000 psi), good high temperature strength, extreme toughness at sub-zero temperatures, good resistance to abrasion, impact, and abuse. You get all of these properties in one steel that is easy to weld.

You can use "T-1" to reduce weight . . . to lengthen service life . . . to reduce costs. Look around you. You'll find a job for it—a job that no other steel can do so well. United States Steel, Room 5140, Pittsburgh 30, Pa.

UNITED STATES STEEL CORPORATION, PITTSBURGH • COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO
TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA.
UNITED STATES STEEL SUPPLY DIVISION, WAREHOUSE DISTRIBUTORS, COAST-TO-COAST
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

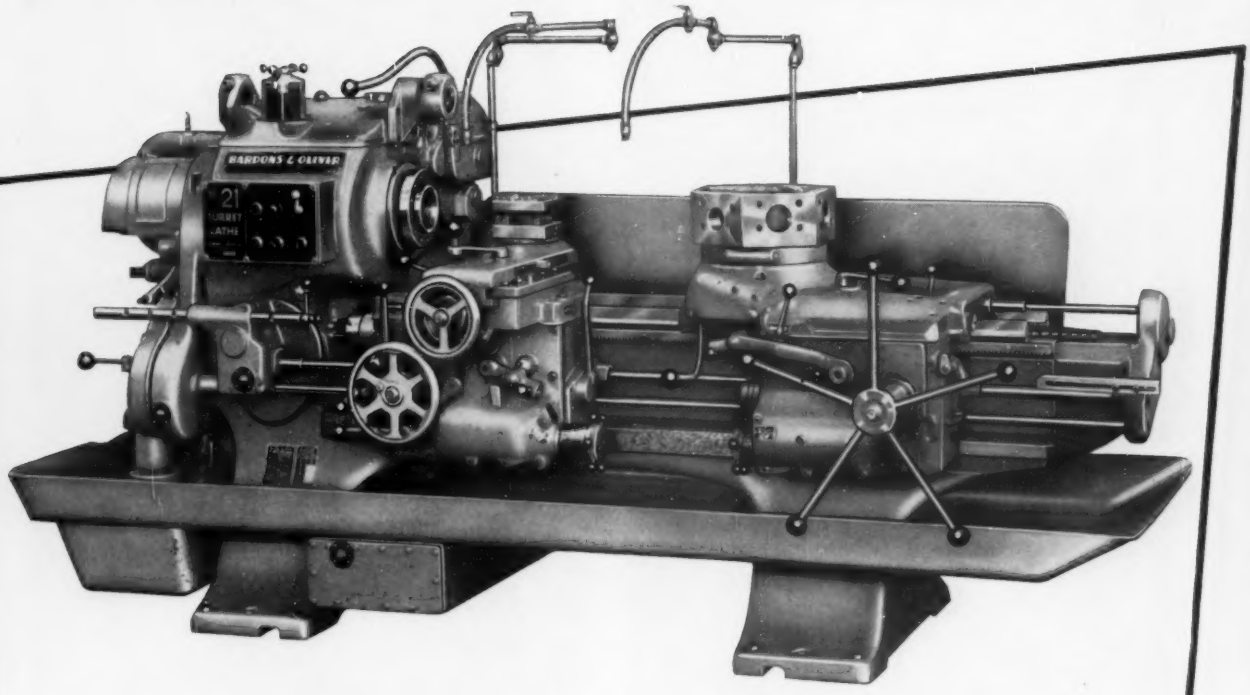
USS "T" CONSTRUCTIONAL ALLOY STEEL

USS

UNITED STATES STEEL

NEW BARDONS & OLIVER No. 21

. . . a Completely Redesigned Saddle Type Turret Lathe



This smaller size Bardons & Oliver Saddle Type Turret Lathe has been redesigned to provide maximum versatility. The new No. 21 will accommodate a wider range of work, both as to size and type.

A larger main drive motor of 20 H.P. permits heavier feeds to the full capacity of the latest in cutting tools.

Higher spindle speeds, to 1000 R.P.M., adequately provide for work of non-ferrous materials as well as smaller diameters.

While the rigid bridge type cross slide carriage is still optional, a choice is now offered of a full swing side carriage. The full swing carriage offers the advantages of increasing swing over the cross slide, additional clearance for the hexagon turret tooling, and rapid traverse to the cross slide. These features are particularly desirable for the larger range of chucking work.

A completely self-contained hydraulic bar feed decreases the feed out time by one-half. The new hydraulic collet chuck has amply increased gripping force for the heavier drilling operations.

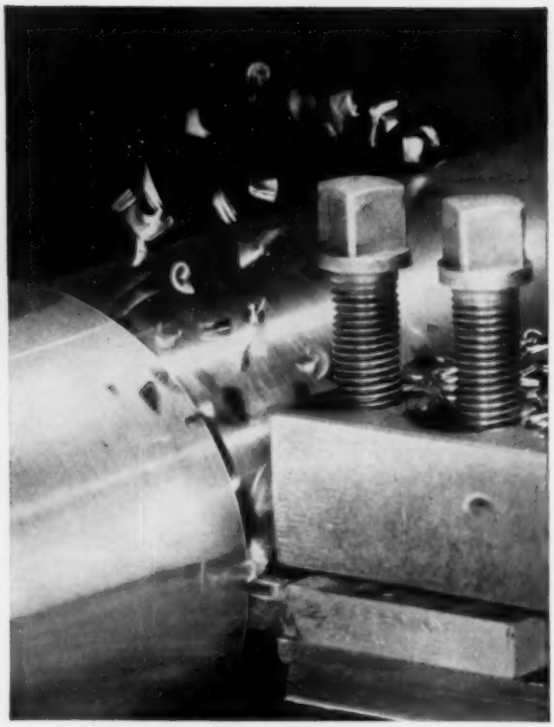
The No. 21 B size machine has 3" round collet chuck capacity for standard duty work. The No. 21 C size machine has 4½" round collet chuck capacity, for light duty work. Both sizes of machines provide either 15½" swing over cross slide with full swing carriage, or 12½" swing over cross slide with bridge type carriage.

BARDONS & OLIVER, INC.

1136 WEST 9TH STREET • CLEVELAND 13, OHIO

FOUR POSITIVE STEPS YOU METAL AT THE LOWEST

Carboloy Machinability Computer accurately determines most efficient setup conditions.



Carboloy Grades 350 and 370 cut faster, wear longer. (Picture taken at 1/1000 second).

1 **Solve machining problems with the new Carboloy® Machinability Computer,** and you'll cut out hours of nonproductive setup time, and eliminate wasteful tryout runs. Faster, more accurately than any other method, the Computer determines the most efficient operating conditions for both simple and complex jobs.

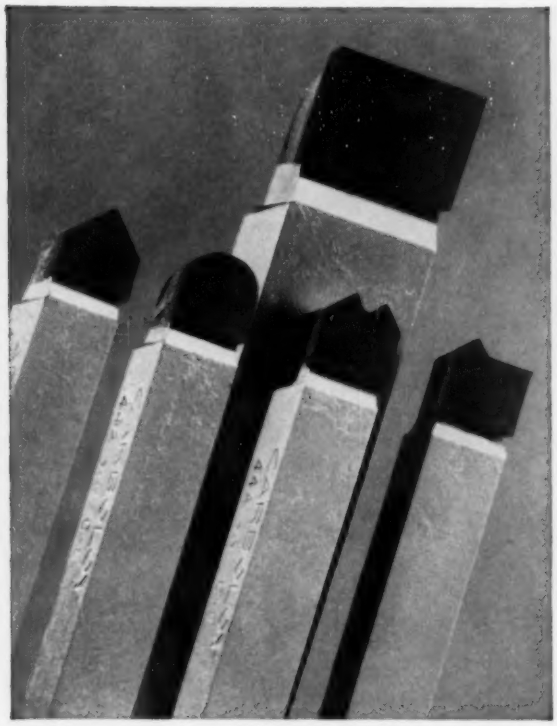
In seconds, it calculates the effect of the 19 most critical machining variables on the material to be cut, the cutting tool, and the cutting conditions. It shows how to set up optimum cutting conditions the first time a job is run, as well as how to improve existing setups. Price of the Computer is $495, f.o.b. Detroit.

2 **Cut steel with Carboloy® Grades 350 and 370,** and you'll increase production while reducing downtime and tool costs. Hundreds of in-plant comparison tests have proved these grades greatly outperform conventional carbides . . . providing the lowest tool-cost-per-piece of any carbide on the market today.

There are no "equivalent grades" for Carboloy 350 and 370, because these grades have a built-in structural rigidity that enables them to take deeper, more punishing cuts without the edge deformation encountered in other carbides. They will cut faster, wear longer, and get more production from your existing machine tools.

Consistent use of these Carboloy products will help you get maximum output from your machine tools . . . at lowest possible cost. For more information and tooling assistance, contact your local Authorized Carboloy Distributor (listed in the Yellow Pages of your phone book), or your Carboloy Representative.

CAN TAKE NOW TO CUT POSSIBLE COST



Style C Standard Carboloy Tool and typical special shapes quickly adaptable from it.

New Carboloy Toolholders can be indexed quickly, easily . . . right in the machine.

3 Apply Standard Carboloy Tools wherever possible, and you'll eliminate many higher cost "specials," while reducing over-all single-point tool inventories by as much as 30%. By standardizing, you will be using only 13 basic styles —"as is," or ground to special shapes – on up to 80% of your setups where braze-type tooling is used.

There are no inventory problems when you use "standards." These versatile tools are stocked in grades to handle any job from roughing to finishing on metals or nonmetals. You can get immediate delivery and tooling assistance from your local Authorized Carboloy Distributor.

4 Make maximum use of the new, easier-to-use Carboloy Toolholders, and you'll reduce tool-change time and lower insert costs. These holders employ a special clamping device combined with a carbide chipbreaker, which makes it possible to index a blank rapidly and accurately without removing the holder from the machine.

In addition, they utilize a shock-absorbent pad beneath the cutting blank, to permit the use of thinner, more economical inserts at increased speeds and feeds. And, because they are versatile, precision tools, they can be quickly adapted to many jobs you are now forced to tool with costly "specials."

CARBOLOY

DEPARTMENT OF GENERAL ELECTRIC COMPANY

11153 E. 8 Mile Ave., Detroit 32, Michigan

"Carboloy" is the trademark for products of the Carboloy Department of General Electric Company

How a simple stud strengthens Morgan cranes!

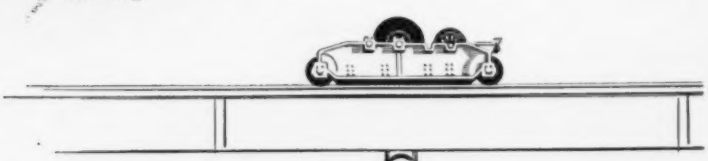
• *Stud welding* of bridge cover plates makes Morgan cranes structurally stronger . . . prevents corrosion inside the girder due to dirt and moisture leaking through holes in the plate . . . stops dangerous scale formation.

Former fabrication method of punching holes in the top plate and fastening rails with T-head bolts weakens the girder. With Morgan's method, stud welds are actually stronger than the parent metal.

Stud welding is still another example of the advanced design and construction features that make Morgan cranes the best in the business.

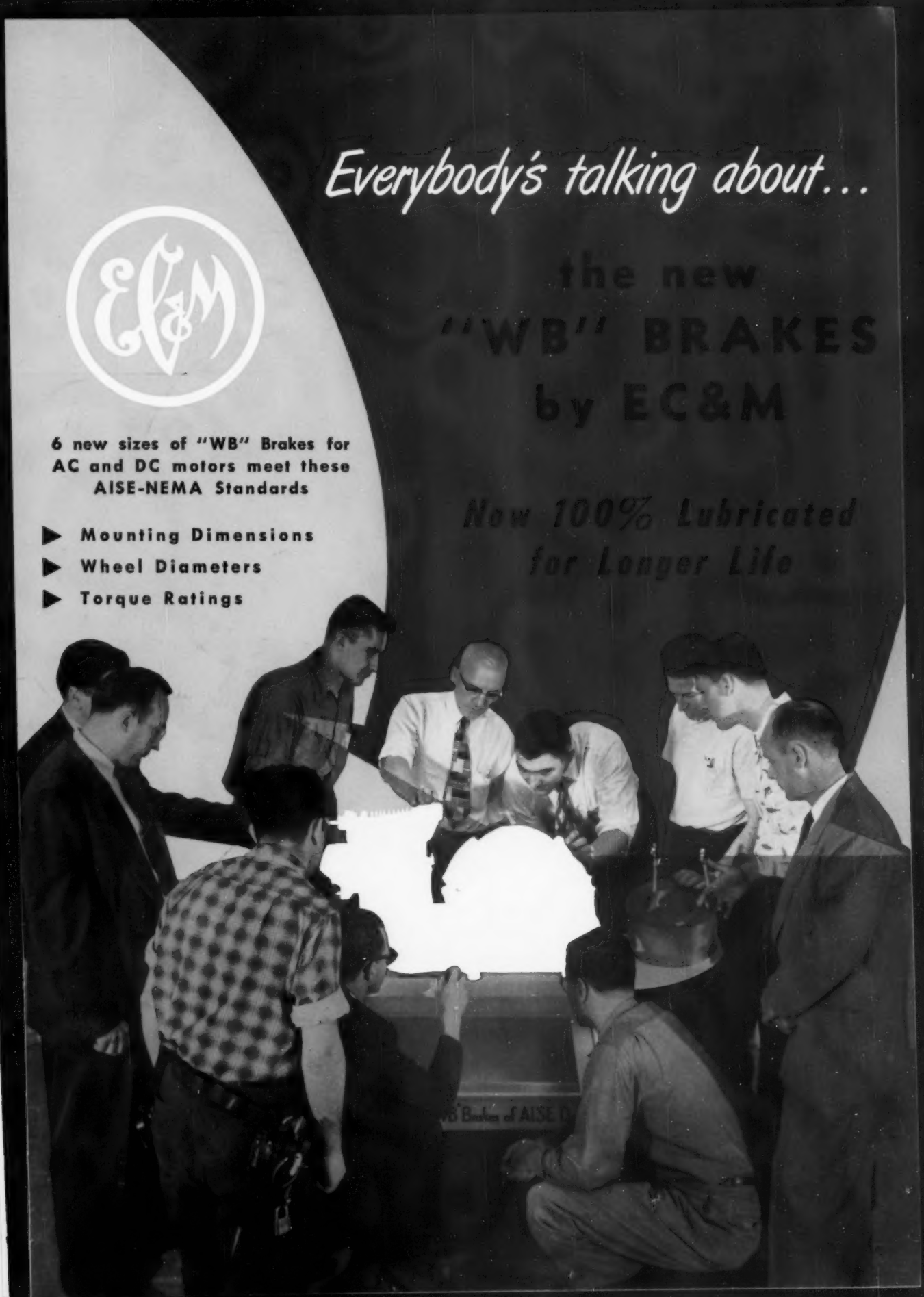
Performance records prove that Morgan cranes cost less to operate and maintain. Let our representative show you how to save the most by buying the best . . . Morgan!

By welding studs to cover plates, rails can be fastened to crane bridge without punching holes for T-head bolts . . . structural strength of the plate is protected. Static tension, torsion and impact tension tests prove the weld is stronger than the stud or parent metal.



The Morgan Engineering Company, founded in 1868, manufactures overhead electric traveling cranes, gantry cranes, charging machines, plate mills, blooming mills, structural mills, shears, saws, and auxiliary equipment.

THE
MORGAN
ENGINEERING CO. *Alliance, Ohio*


Everybody's talking about...
the new
"WB" BRAKES
by EC&M
Now 100% Lubricated
for Longer Life
6 new sizes of "WB" Brakes for
AC and DC motors meet these
AISE-NEMA Standards
Mounting Dimensions
Wheel Diameters
Torque Ratings

these improvements
EASIER TO MAINTAIN

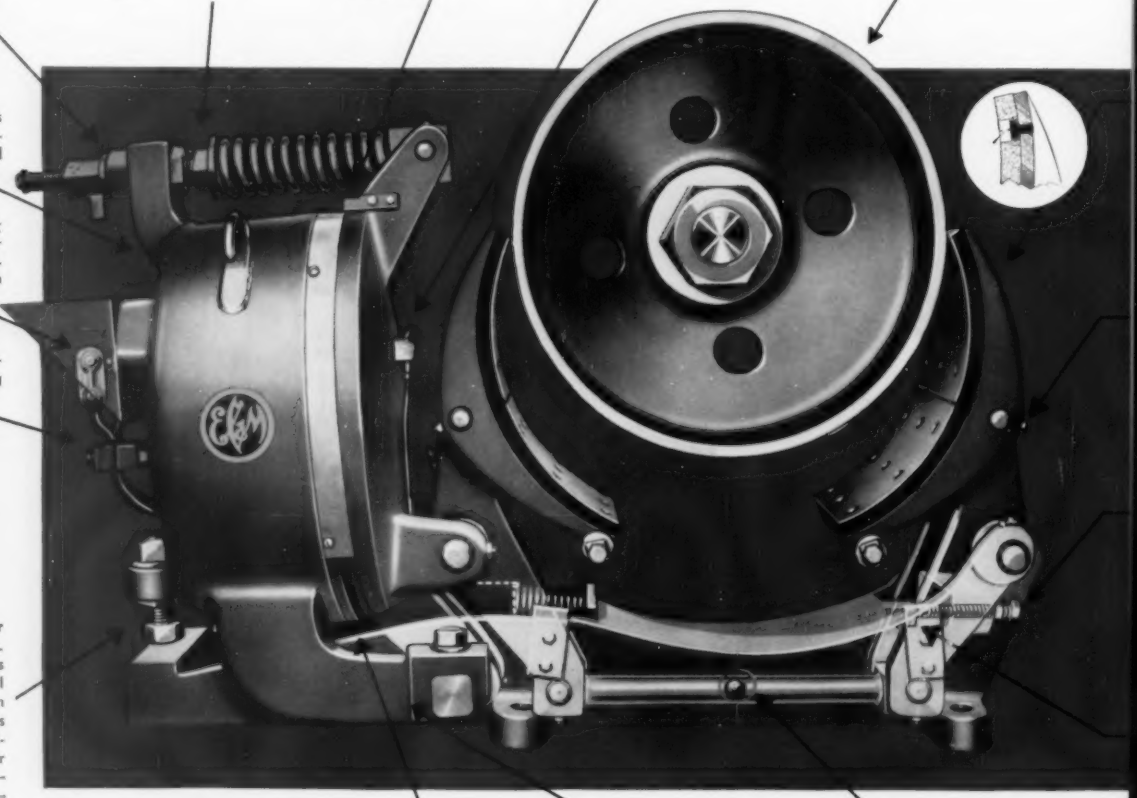
Manual release is standard on all sizes of these AISE-NEMA WB Brakes.

Bronze adjusting-nut on torque-spring rod has fine pitch threads for easier and closer adjustment.

Armature air-gap indicator shows visually when adjustment is needed to compensate for brake-lining wear.

100% - lubricated forces dirt out, all bearings alemite-lubricated.

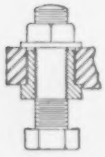
ECAMITE wheels are furnished as standard on all "WB" Brakes.



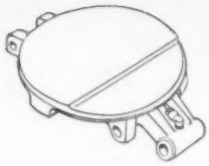
Magnet-case remains stationary and contains unit, armored coil.

Coil leads with solderless connectors under protective shield. Conduit connection box is optional.

Cable clamps for customer's incoming leads.



Single adjustment for brake lining wear. Adjusting-nut screws into stainless steel threaded bushing in magnet-case. This gives longer threaded path for greater bearing surface — easier adjustment — only single wrench required. Nut on top locks against machined surface.



Armature-face recessed at bottom allows dust to fall free — prevents clogging.

Magnet-case removable as a unit without disturbing remainder of brake.

Connecting lever remains below the brake wheel and is of tubular construction. Alemite fitting (on both sides) permits greasing four bearings from this one fitting.

ARMORED COIL CONSTRUCTION

WB Brake coils . . . protected by a steel enclosure, permit quick coil removal. After vacuum-impregnating with No. 371 polymerizing varnish and baking, coil is sealed in its protective enclosure with No. 372 Epoxy compound. This compound does not soften, but holds the coil securely against movement.

make the new "WB" brakes

. . . LONGER LASTING!

Molded brake blocks, riveted securely in place, are made from an improved material having a higher coefficient of friction. Permissible wear is ⅛" on the smallest size to 7/16" on the largest size.

Fixed bearing-pins locked with stainless steel setscrews reduce number of lubrication points.

This adjustment equalizes clearance of both shoes.

Hardened steel camrails retain clearance between shoes and wheel with brake released.

These new EC&M "WB" Brakes are built to AISE-NEMA standards. The basic principles which made "WB" Brakes the outstanding brake for heavy mill service have not been changed. The new design includes several improvements making EC&M "WB" Brakes even longer lasting and easier to maintain. These improvements are:

1 — 100% lubrication . . . for longer life, for freedom of operation by forcing dirt out of bearing surfaces.

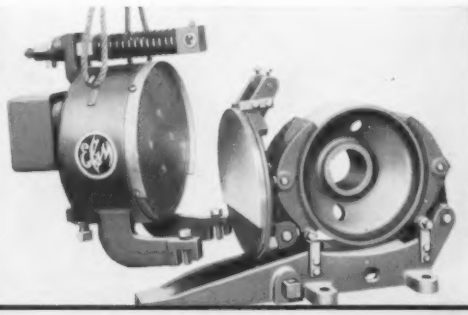
2 — Recessed armature . . . eliminating pocket for dust collection.

3 — Single wrench adjustment for brake-block wear . . . restores air-gap to normal, adjusting-nut has fine pitched threads.

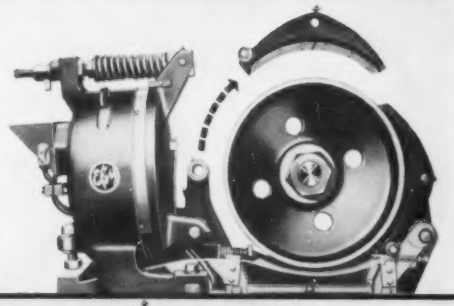
Remaining unchanged because of their proven acceptance and time-saving advantages are these features:-nothing over the brake wheel, manual release, single adjustment for lining wear, stationary magnet and sturdy 2-shoe construction.

These new EC&M "WB" Brakes are available with series and shunt coils for d-c service, and are supplied for rectifier-operation on a-c circuits. For LONG-LIFE Brakes, specify "WB" Brakes by EC&M.

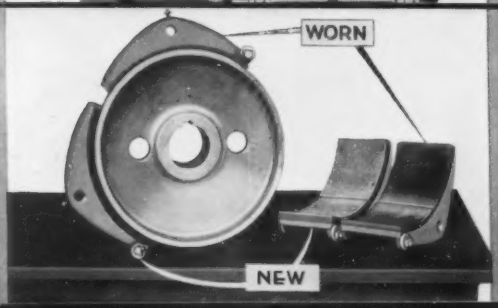
SIMPLIFIED MAGNET REMOVAL
Maintenance men appreciate the time-saving construction that makes coil changing a simple procedure. The magnet case can be swung away without disturbing the remainder of the brake. A coil can be replaced quickly or a complete new magnet installed in a matter of minutes.

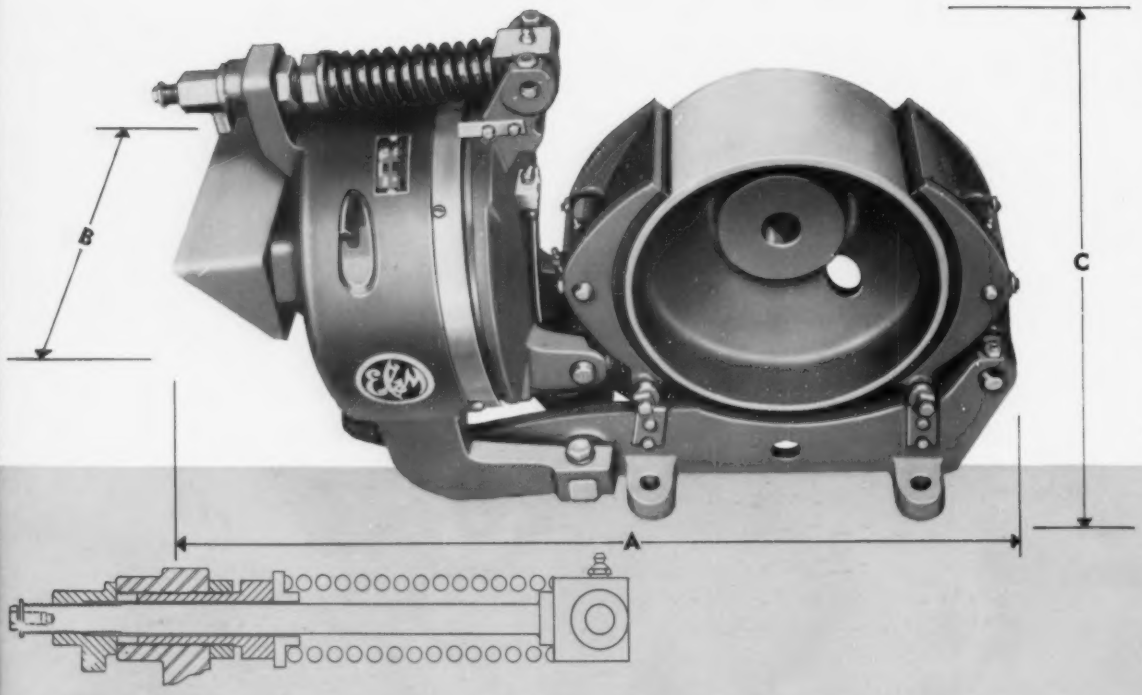


SHOES AND LINERS EASILY REMOVED
With shoe bearing-pins slipped out, shoes slide up on top of the wheel easily to permit worn brake-linings to be replaced. This has been standard construction with "WB" Brakes for years.



ACCURATELY FORMED RENEWABLE BRAKE BLOCKS
WB Brake Blocks retain their frictional quality longer than any other braking material. They are accurately formed so that new blocks fit the arc of the wheel and shoe surface as accurately as the original block.

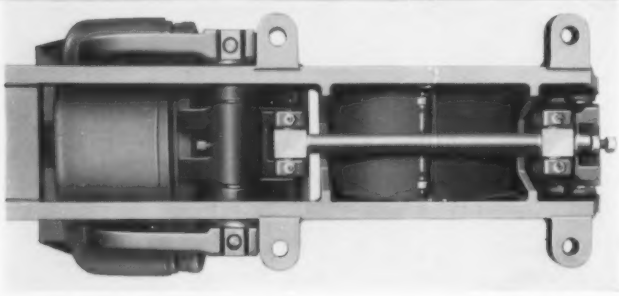




NEW OPERATING SPRING CONSTRUCTION

Operating spring force transmitted directly to magnet armature. Guide rod, threaded only at outer end under manual release (bronze) nut, is under tension only when brake is manually released. Brake torque is adjustable by a bronze nut threaded into the magnet-lug. Fine pitch threads permit closer and easier torque-adjustment. A jam-nut locks the setting.

Brake Size (Wheel Diameter)	600-Series Motor size	BRAKE TORQUE RATINGS in Lbs. Ft.				Approximate Outline Dimensions in Inches		
		Series-Wound Brakes		Shunt-Wound Brakes				
		½ hour Rating	1-hour Rating	1-hour Rating	Continuous Rating	Length "A"	Width "B"	Height "C"
8" WB	402 602	100	65	100	75	24¼	9¼	13½
10" WB	603 604	200	130	200	150	27¼	10¾	16⅜
13" WB	606 608	550	365	550	400	34¾	13¼	20⅛
16" WB	610	1000	650	1000	750	38⅝	15½	22¾
19" WB	612 614	2000	1300	2000	1500	45¾	18½	26½
23" WB	616 618	4000	2600	4000	3000	55⅜	21⅞	31⅝



Bottom view of new "WB" Brake showing tubular connecting lever for lubricating bearings at both ends from one alemite-fitting. The brake can be mounted either right or left hand, and the lubrication may be applied from either side through an opening in the brake frame.

EC&M "WB" Brakes have long been known for their fast response in releasing and setting. The fundamental short-stroke characteristic of these new "WB" Brakes which gives quick action has been proved on crane-hoists and hard-worked mill applications. Unit pressure between brake shoe and wheel remains at substantially the same low value as in the previous WB Brakes. These new EC&M "WB" Brakes, built to the AISE-NEMA Standards, are designed to give smoother operation . . . safer stops . . . and less maintenance. Specify EC&M Bulletin 1000 Type WB Brakes.

THE ELECTRIC CONTROLLER & MFG. CO.

A Division of the Square D Company

4498 LEE ROAD • CLEVELAND 28, OHIO

SEVENTY-SIX 10-hp d-c approach table motors for McLouth reversing roughing mill.

With the help of G-E system-engineered electrical equipment . . .

McLouth Steel improves hot strip production through increased flexibility and ease of maintenance

The new 60-inch hot strip mill at McLouth Steel Corporation's expanded Trenton, Michigan, plant utilizes individual d-c motors for each roll of roughing mill front and rear tables, as well as roughing and finishing mill approach tables, and pumpless rectifiers in unit substation arrangement to supply power to individual finishing stand d-c motors. These unique applications result in greatly increased flexibility and ease of maintenance.

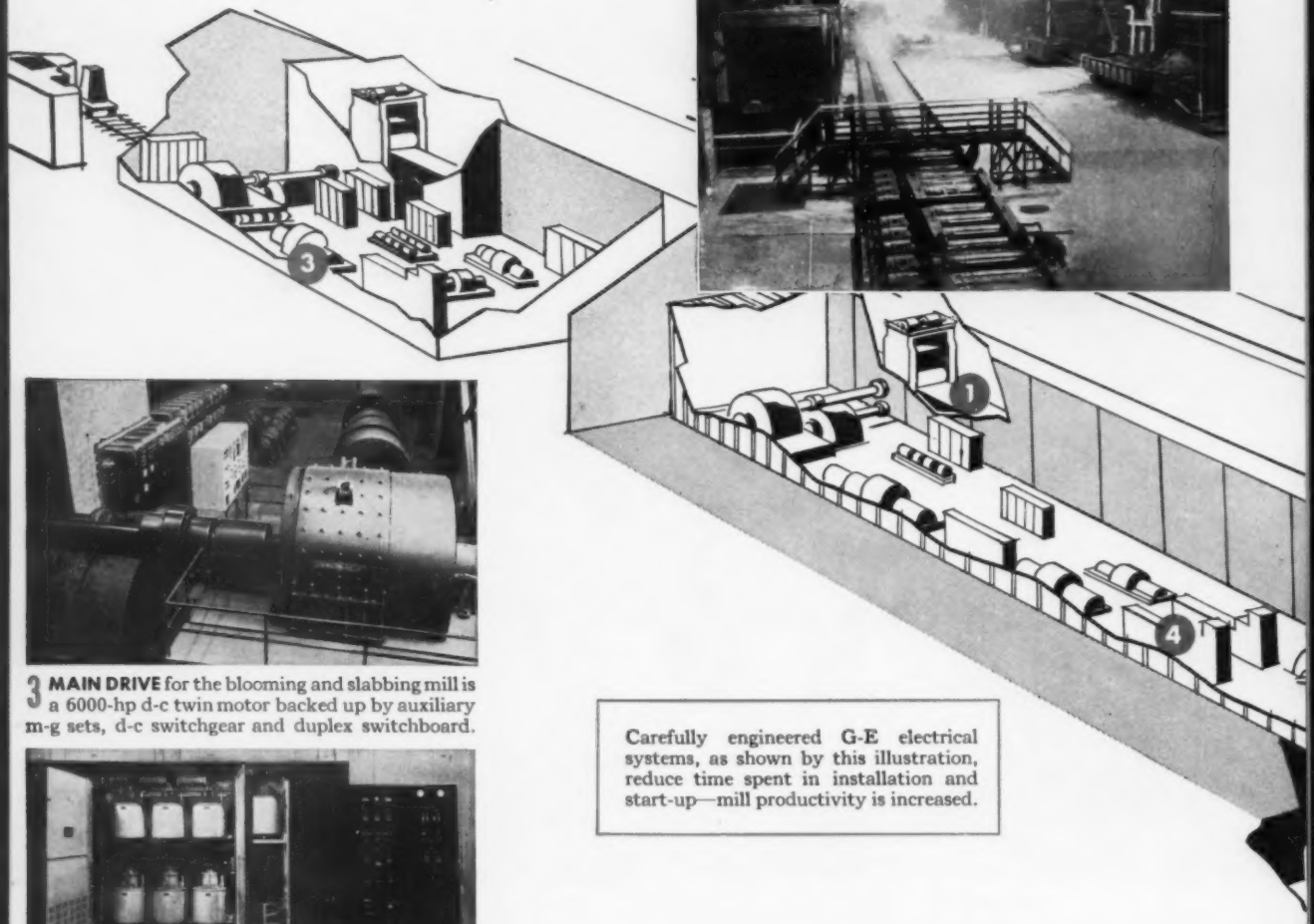
In addition McLouth engineers predict savings of $60,000 per year in lubrication costs alone by switching to individual roll drive d-c motors. This application of individual d-c motors eliminates the need for reduction and bevel gears and line shaft and therefore minimizes maintenance and periods of unscheduled downtime. 659-108

SEE ELECTRICAL SYSTEM LAYOUT ➧

GENERAL ELECTRIC

How General Electric System Engineering

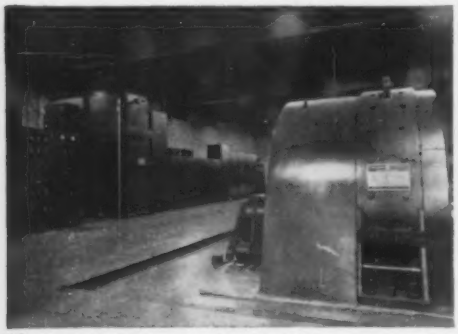
1 146 INDIVIDUAL ROLL MOTORS driving tables result in flexibility of maintenance, decreased operating costs. Engineered design integrates all table sections.



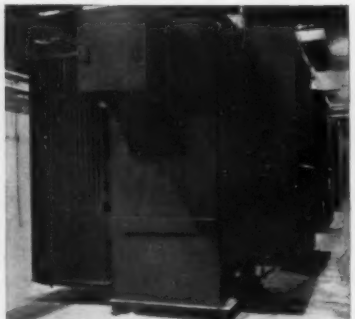
3 MAIN DRIVE for the blooming and slabbing mill is a 6000-hp d-c twin motor backed up by auxiliary m-g sets, d-c switchgear and duplex switchboard.

Carefully engineered G-E electrical systems, as shown by this illustration, reduce time spent in installation and start-up—mill productivity is increased.

4 THIS SECTION of 4000-kw stand 3 rectifier features new ignitron stainless steel tanks and dual ignitors for dependable service—low maintenance.



5 ECONOMY OF INSTALLATION for the hot strip mill is achieved by unit substation construction and close location of the rectifier equipment with respect to the stand motor drives.

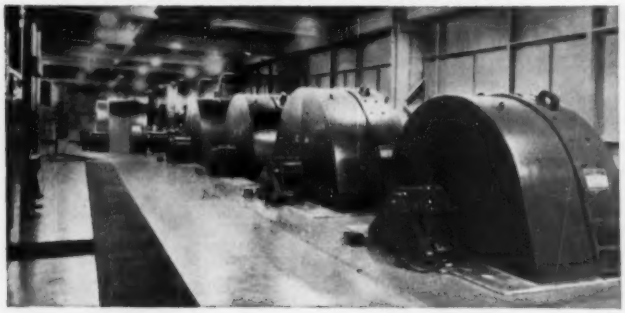


6 EACH STAND'S regulating autotransformer allows operation over wide speed range by individual stand voltage control.

7 SYSTEM ENGINEERING eases motor room operation by centralizing master control functions for mill stands in this duplex control switchboard.

Helped McLouth Increase Productivity

2 **A TOTAL OF 28,500-HP** supplies the "muscle" for the 60-inch 6-stand hot strip finishing mill. Motor room stand 1 to 5 motors are rated 5,000-hp. Stand 6 motor (on right) furnishes 3500-hp.

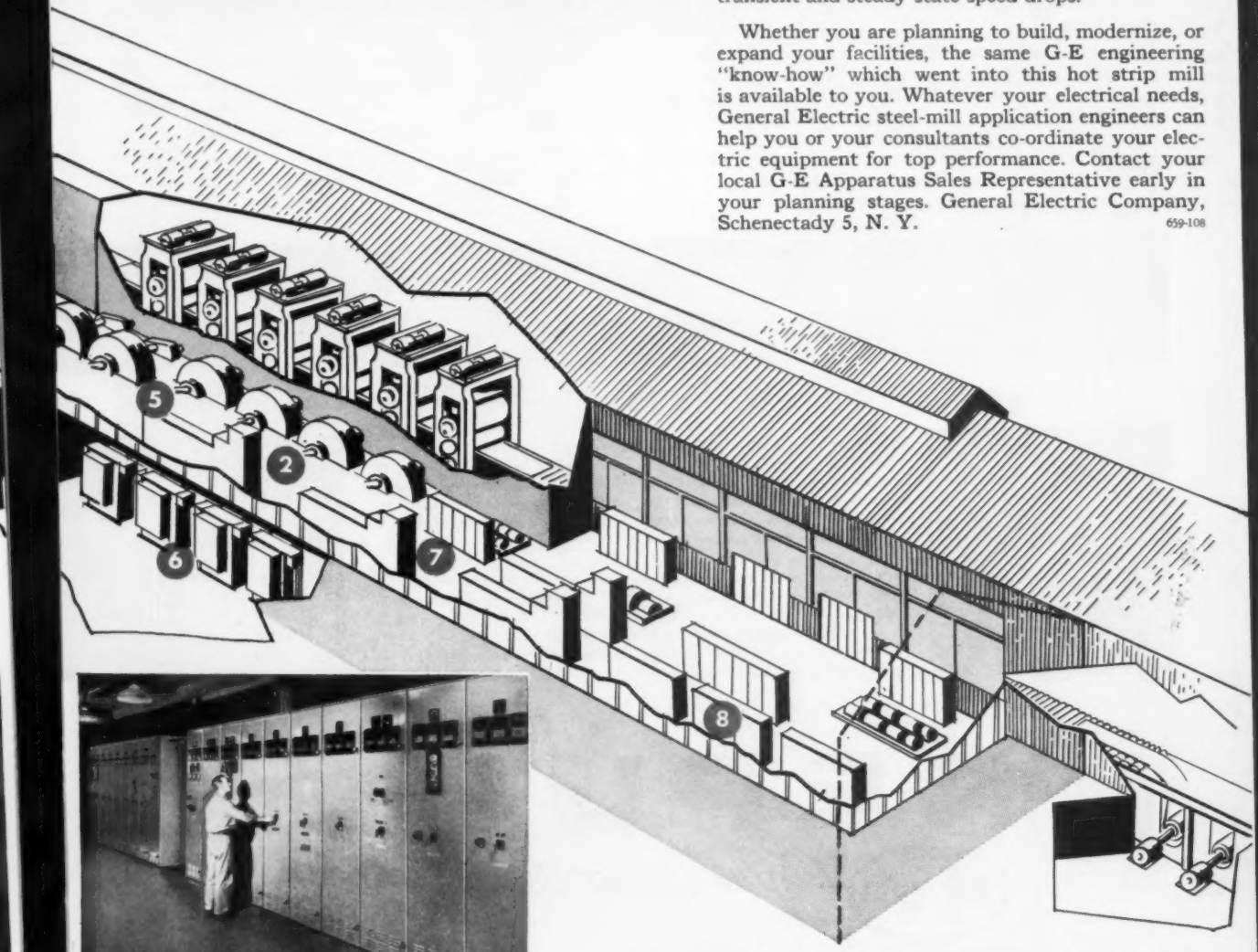


EXCELLENT EXAMPLE OF STEEL MILL PROGRESS

McLouth's new hot strip mill is an excellent example of the progress made in the application of electrical equipment to semi-continuous hot strip mills. This new plant, in full production 15 months from date of order, will produce up to one million tons of strip annually.

G-E designed individual-rectifier control gives the mill greater flexibility and simplicity of operation, plus a higher percentage of "on-gage" strip. G-E d-c drive motors are specially designed to withstand frequently repeated heavy loads with minimum transient and steady state speed drops.

Whether you are planning to build, modernize, or expand your facilities, the same G-E engineering "know-how" which went into this hot strip mill is available to you. Whatever your electrical needs, General Electric steel-mill application engineers can help you or your consultants co-ordinate your electric equipment for top performance. Contact your local G-E Apparatus Sales Representative early in your planning stages. General Electric Company, Schenectady 5, N. Y. 659-108



8 **ALL INCOMING POWER** flows through this a-c metal-clad switchgear. Reliable magne-blast air circuit breakers provide service entrance and feeder protection.

Engineered Electrical Systems for Steel Mills

GENERAL ELECTRIC

These turboprop propeller blades

Model CT634S of the Curtiss-Wright Turbolectric series was the first U. S.-designed and built turboprop propeller to be certificated for commercial use by the Civil Aeronautics Administration. This model and others are already in quantity production for military aircraft.

Turbolectric propellers use extruded hollow steel blades produced by the controlled extrusion process developed by Curtiss-Wright. The extruded blade begins as a single-piece alloy steel billet.

With the development of this propeller and the controlled extrusion process came the need to select the right alloy steel. And here's where teamwork paid off.

Republic metallurgists, working closely with Curtiss-Wright metallurgists and engineers, selected an alloy steel with the following properties that make the extrusion process successful from both a production and cost standpoint: freedom from imperfections, uniform response to heat treatment, workability in all stages, weldability, bendability—hot or cold.

These properties in combination with the extrusion process give:

(1) IMPROVED STRENGTH-WEIGHT RATIO. The tough, integral structure of the extruded alloy steel blade provides greater strength and resistance to fatigue with minimum weight.

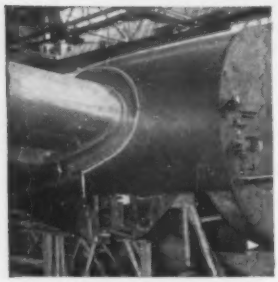
(2) IMPROVED QUALITY. Greater uniformity is assured by fabricating from a single homogeneous material.

(3) INCREASED PRODUCTION. The number of manufacturing operations is reduced. Production per hour is increased. Floor space is saved.

(4) REDUCED COST. Less steel for original stock, less machining, and lower cost tooling and equipment are required. Expensive welding and accompanying preheating and post-heating operations, as well as milling operations, have been reduced.

What about your product? Are you using the right steel in the right place? Republic—world's largest producer of alloy and stainless steels—offers you the services of experienced field metallurgists who will work with your staff in determining where these versatile steels can effect the greatest savings. Just send us the coupon.

Strength-to-Weight or Heat Problems—Republic Has the Answers



◀**TITANIUM SAVES WEIGHT ON DC-7** with no sacrifice in strength or safety. Republic is an old hand at this high strength-to-weight business. We pioneered the use of alloy steels, then stainless steels—followed by high strength steels. Now come Republic Titanium and Titanium Alloys. Years of experience gained in helping hundreds of manufacturers design and re-design their products to get more strength with less weight are available to you.

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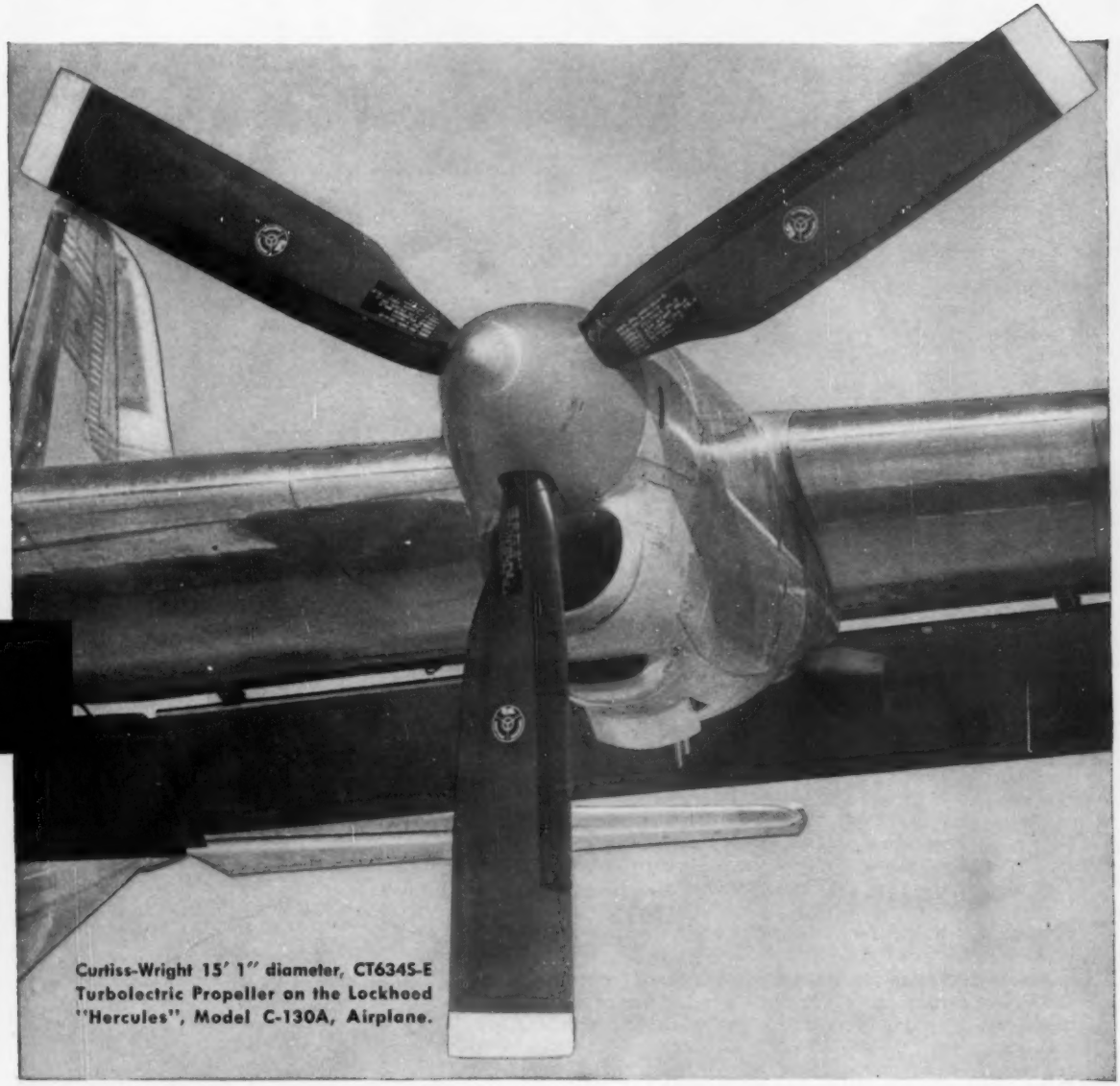

Curtiss-Wright 15' 1" diameter, CT6345-E Turbolectric Propeller on the Lockheed "Hercules", Model C-130A, Airplane.

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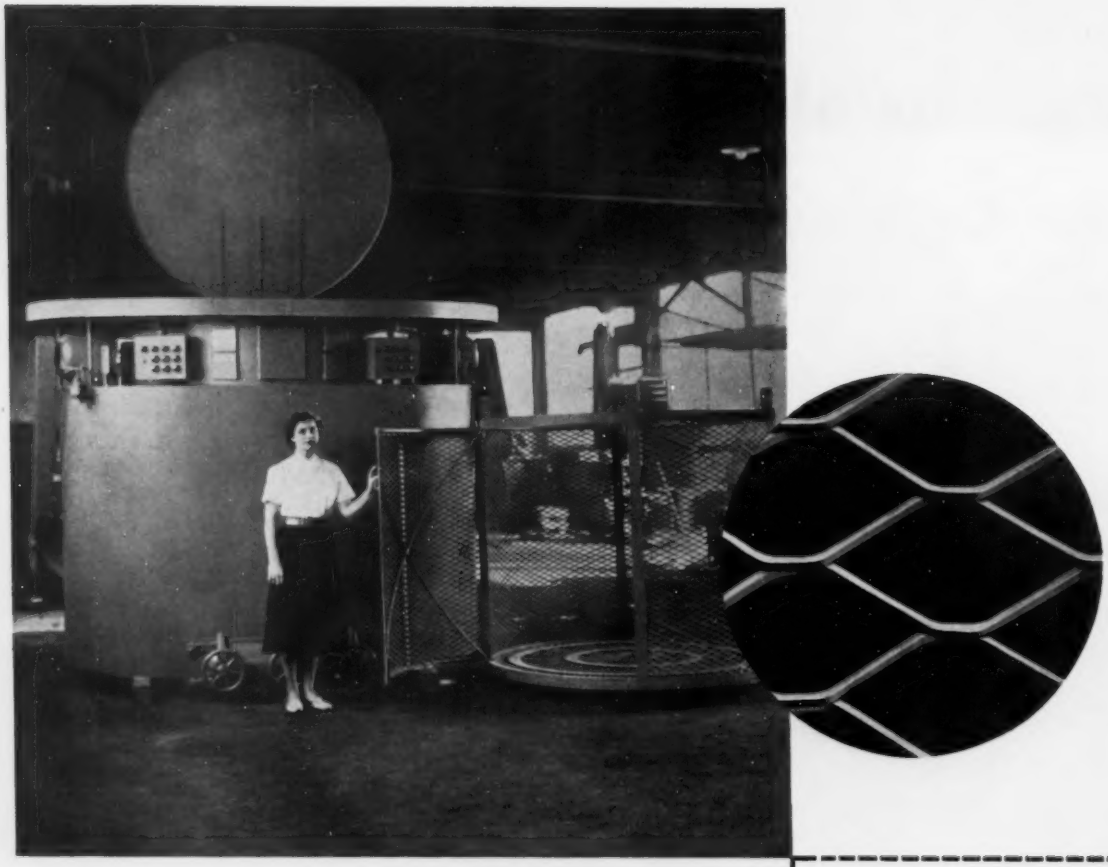

How jet engines take a bath in an expanded metal basket

The J. P. "Whirlpool" industrial cleaner, shown above, cleans jet engines and parts at an Air Force base. Made by J. P. Manufacturing Co., of Youngstown, Ohio, the cleaner has an expanded metal basket with a two-ton capacity. A propeller and whirlpool circulate cleaning solution through the basket's mesh, searing off all deposits on metals being cleaned.

Penmetal expanded metal was ideal material from which to form the basket. Strong enough to take a two-ton load, yet with an open mesh, which permits free-circulation of the solution. It's low in cost, too.

Penmetal expanded metal is easily formed, shaped and welded. Comes in corrosion-resistant metals and carbon steel; large or small mesh; light or heavy gauge.

Can this versatile material turn *your* problem into a profit? Send for 28-page catalog, which suggests uses, and gives mesh sizes, weights and dimensions.

PENN METAL COMPANY, INC.

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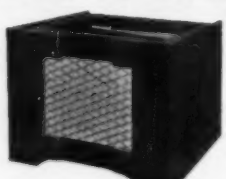
METAL MARK Penmetal 1869 FOR QUALITY

OTHER USES FOR EXPANDED METAL

Barbeque grill by Chattanooga Royal Company, Chattanooga, Tenn. Shelf is expanded metal.



TV Base, made by Griffith Co., Parkersburg, West Virginia. Front decoration of expanded metal.

PM-83

"save 80% on welding gas costs with new MAGS* process!"

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Liquid Carbonic's new all CO_2 *gas* method!

Save approximately 7¢ on every foot of shielding gas you use! LIQUID's new process uses low cost CO_2 (1½¢ or less per cu. ft.) in place of expensive argon or helium.

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High quality, high speed welds. Liquid Carbonic's new all CO_2 gas method produces welds of equal or superior quality to welds made with straight argon or helium.

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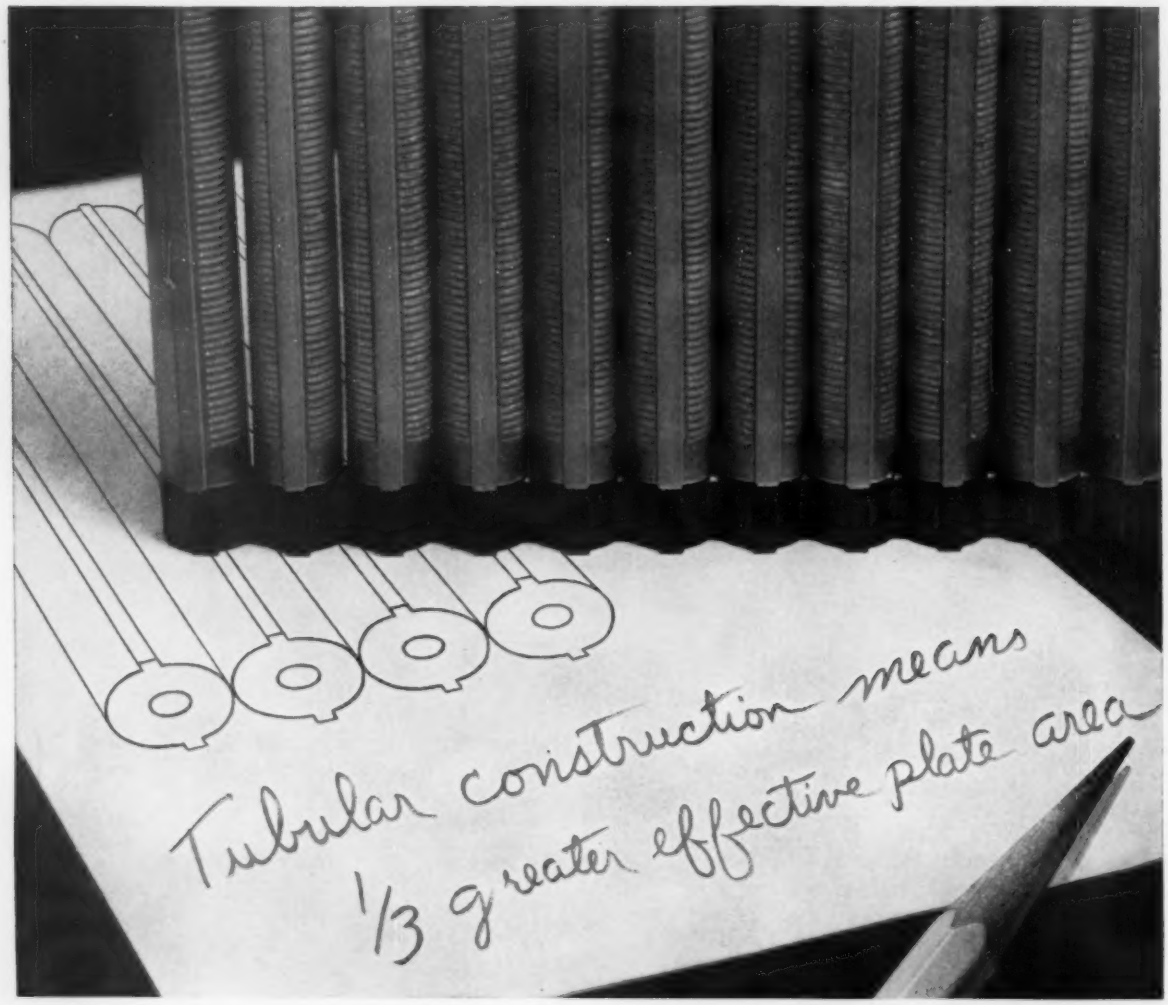
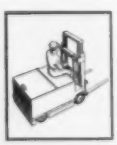
EXIDE-IRONCLAD BATTERIES



Greater effective plate area boosts power for peak loads

BATTERY FOR POWERED HAND TRUCK, Model TH. Fits snugly into space provided on truck. Has tubular construction of positive plates, Silvium grids, "Permanized" negative plates, extra heavy connectors and all other Exide-Ironclad advantages that mean power to spare in heavy duty applications. Write for Bulletin 5161.



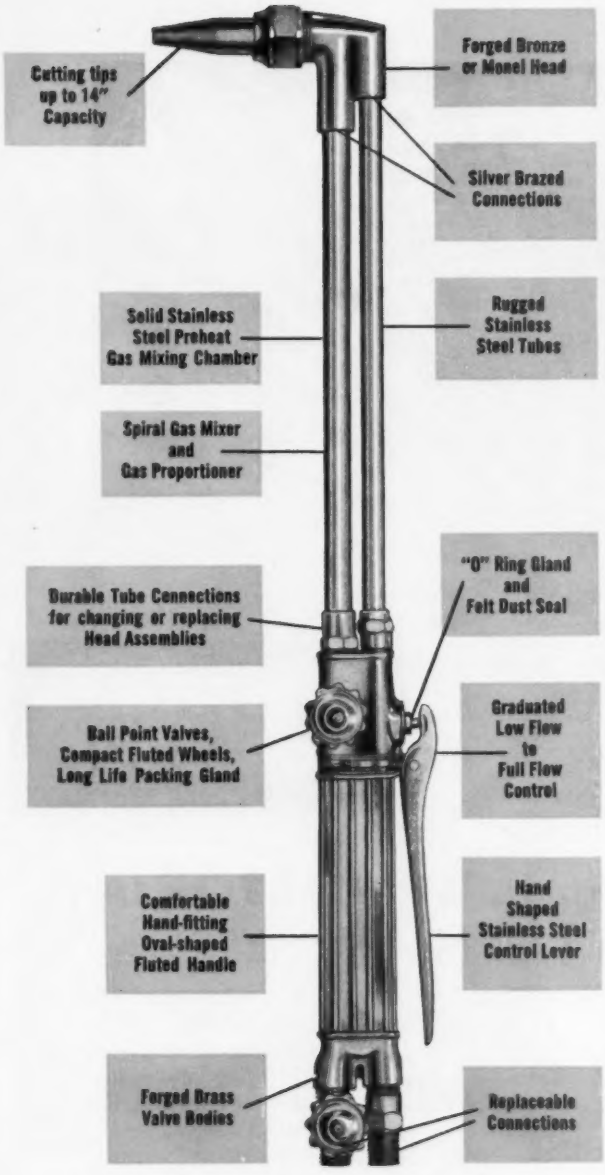
According to general principles of storage battery engineering, power reserve is governed by positive plate area. In the Exide-Ironclad greater effective plate area is achieved without increasing plate size. Here's how:

In the Exide-Ironclad positive plate, active material is held captive in tubes of slotted polyethylene. These tubes are arranged in a tight row with electrical connections only at the top. The actual surface of the plate is the combined semicircular sides of these tubes—the total surface area being roughly one-third more than the projected dimensions of the plate.

In use, this unique design feature means that more active material is exposed to electrolyte for a given size battery. It means the battery can provide power to spare for peak loads as well as a dependable source of continuous power.

Only Exide-Ironclad Batteries have this advantage. Be sure to specify them when you order—for either new equipment or for replacement. Exide Industrial Division, The Electric Storage Battery Company, Phila. 2, Pa.

Exide®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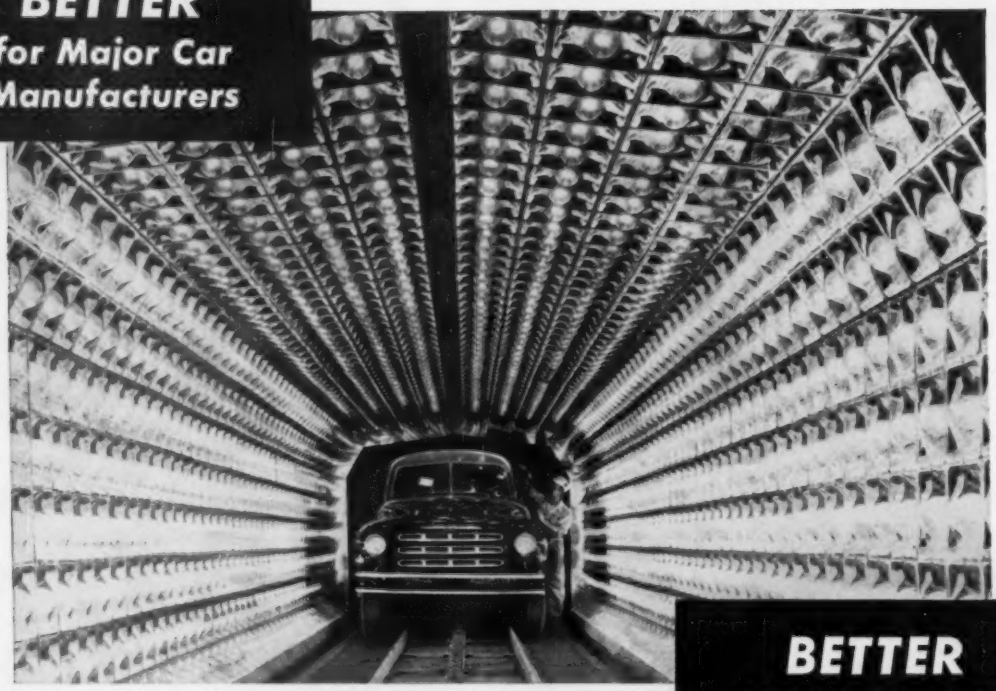

Fostoria Industrial Infrared Ovens are used by every major car manufacturer in more than 300 automotive installations.

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give top-quality results . . . *at lowest cost!*

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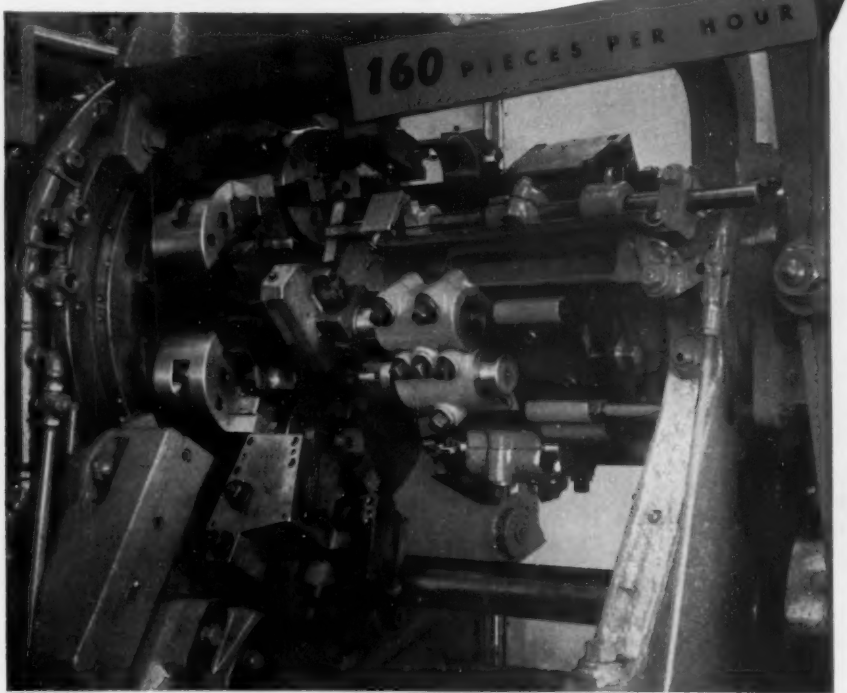

FIRST PASS:

Work is placed in chuck equipped to receive the unfinished casting. Outer end is then rough-and-finish turned on OD (allowing for grinding); ends are faced; spherical seat rough-and-finish turned; centering seat chamfered and turned, and shoulder diameter turned concentric with OD. Groove cut concentric with OD.

SECOND PASS:

Work is turned around after return to loading station and placed in adjacent chuck, unfinished end out, and passed through machine for the same operations. The parts are then separated.

TOOLING: This Baird 76H Chucking Machine is arranged for single indexing with alternate chucks for rough-and-finished ends of the work, two-station live-center attachment, adjustable tool holder for use in machining three different sizes of pistons, and with alternate cycle cut-off.

If your production could benefit by up-to-the-minute, cost-saving "automation" tooling like this . . . "Ask Baird About It."

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(truck + Load Lugger + Containers)

Full container being placed on truck. Self-loading Load Lugger eliminates need for crane or crew—the Load Lugger driver does it alone, in seconds.

✓ simplifies plant refuse disposal...
✓ eliminates multiple handling...
✓ cuts time 200% over former method

***FORMER* METHOD:** 55-gallon drums spotted throughout plant as receptacles for refuse. Two men spent all day, every day, emptying drums into a cart, pushing it to nearest entrance and dumping contents on the ground or into a truck. Despite the time and effort, the plant was never clean. Alloy sludge, in 300-pound chunks, was dumped into a pit, hauled away by truck when the pit was full.

***PRESENT* METHOD:** Fork truck empties drums into Load Lugger containers strategically spotted outside the plant—a one-man, part-time job. Sludge is handled and dumped by fork truck directly into Load Lugger containers. The Load Lugger equipped truck transports the full containers to a refuse-dumping ground—round trip, 20 minutes. *At the end of each day, plant is entirely free of refuse.* What's more, the Load Lugger also handles pipe and other materials—*versatility* is a Load Lugger "plus-value"!

Take a good look around *your* plant. Chances are, there's at *least* one operation—handling refuse, scrap metal, parts, castings, forgings, sub-assemblies, etc.—where the Load Lugger System can drastically reduce costs, give you the advantages of low-cost outdoor storage. Let us help you survey your situation and recommend the right Load Lugger and Containers for your needs.

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Wendel Research & Mfg. Corp., Albertson, New York, encountered extremely short tool life when drilling A.I.S.I. 4140 steel used in the manufacture of pilot ejection seats. They also experienced broken bits, chip welding, discoloration and burning of the tools. Shell Dromus Oil E was recommended to combat these difficulties. Here are the results:

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1. Excellent wetting and cooling properties—wets all metal surfaces extremely fast.
2. Provides longer tool life—better finish.
3. Not sticky or greasy—keeps tools and work exceptionally cool.
4. Forms a solution, not an emulsion . . . is stable in any concentration.
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Write for information on Shell Dromus Oil E. See how it can help you increase tool life.

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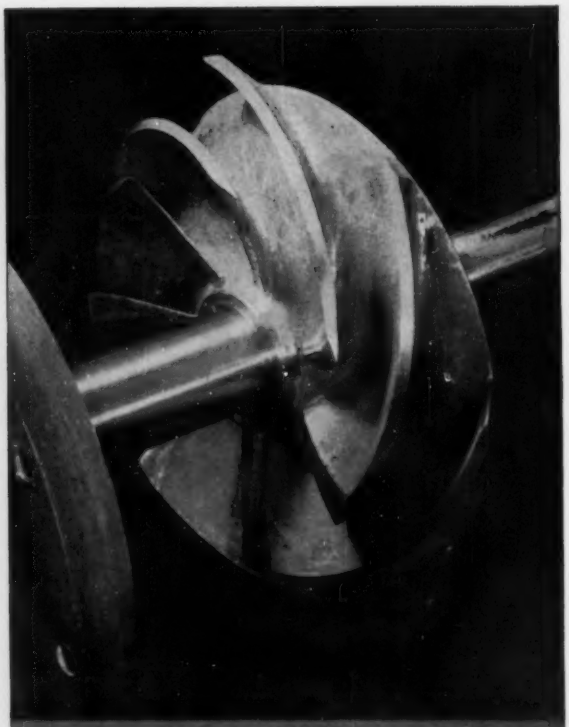

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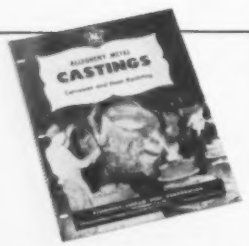
We can handle any job you have



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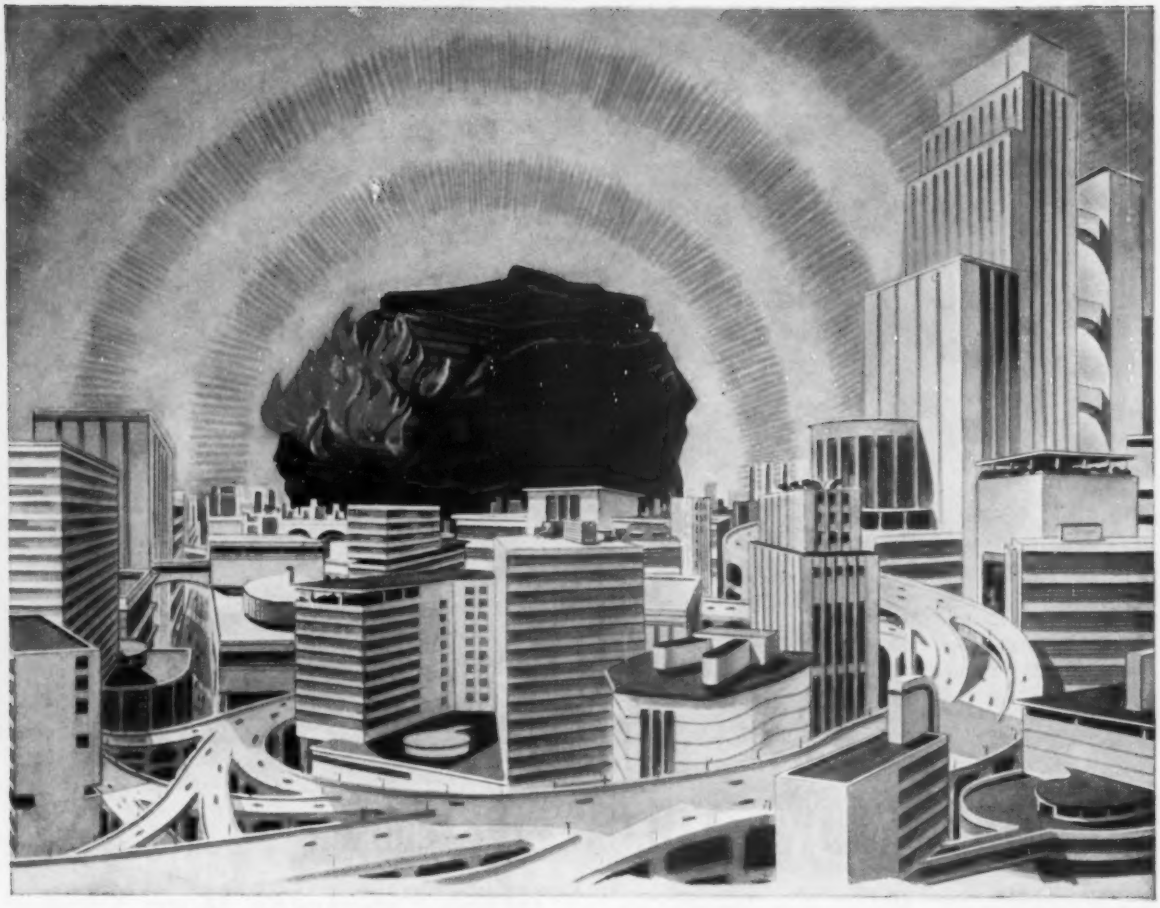

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Youngstown's Yoloy Pipe is shown in the process of being installed. In a radiant heating system like this, the pipe must be good as it's put there to stay.

YOUNGSTOWN YOLOY PIPE chosen for radiant heating system at West Charlotte High School

This handsome school won a First Award in the 1955 School Executive magazine competition. It also won an A.I.A. Award of Merit. Justifiably, too, as it is the result of years of planning by a group of Charlotte's educators and architects.

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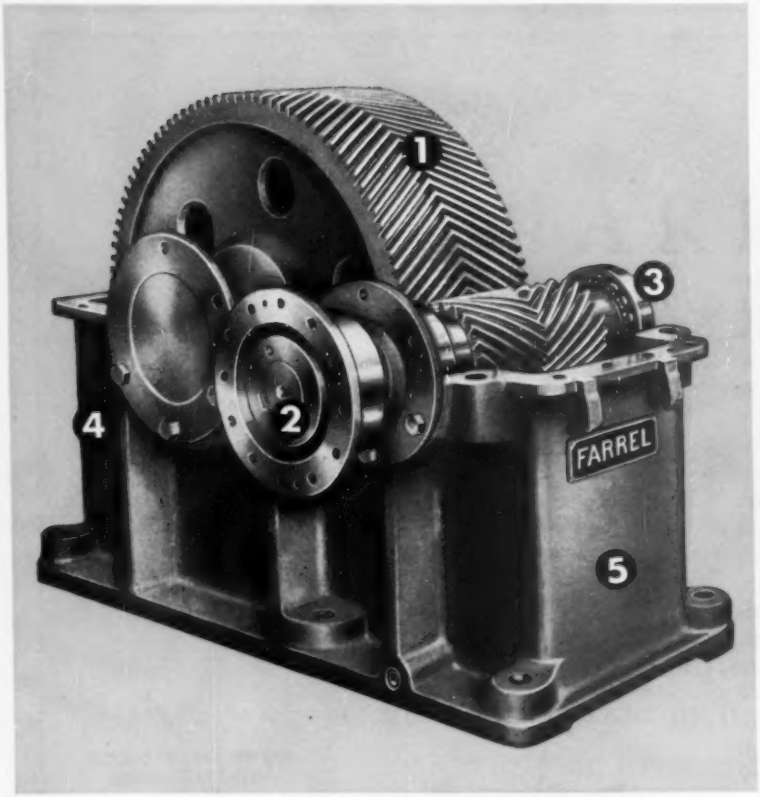

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The various design features of a Farrel speed reducer (a few are pointed out above) equip the unit for prolonged service life where operating conditions are unusual and exacting. They protect against down time, too.

The design of a Farrel unit often permits engineering freedom in proportioning gears, shafts, bearings and even some housing dimensions to meet specific load, speed and service requirements.

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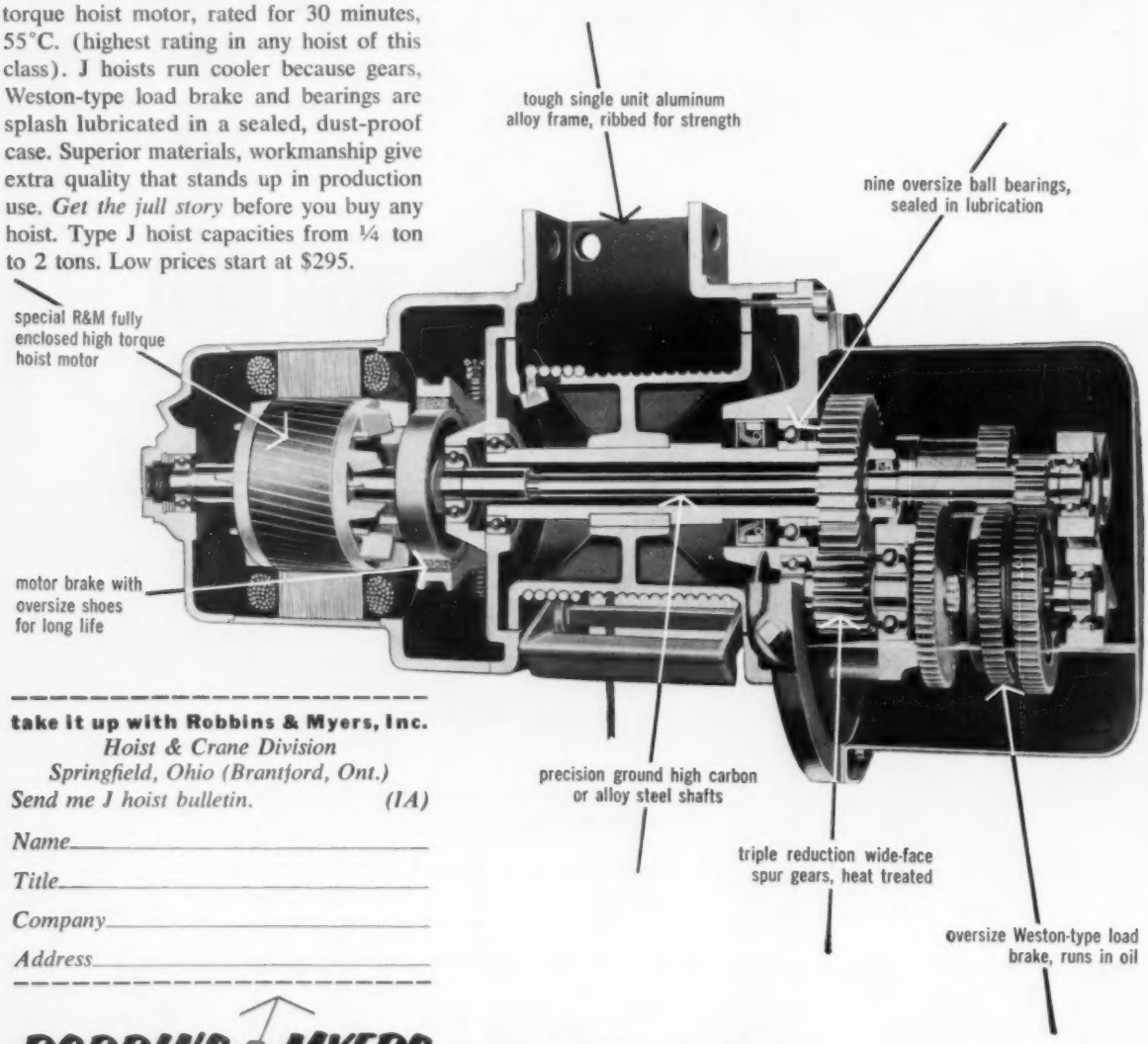
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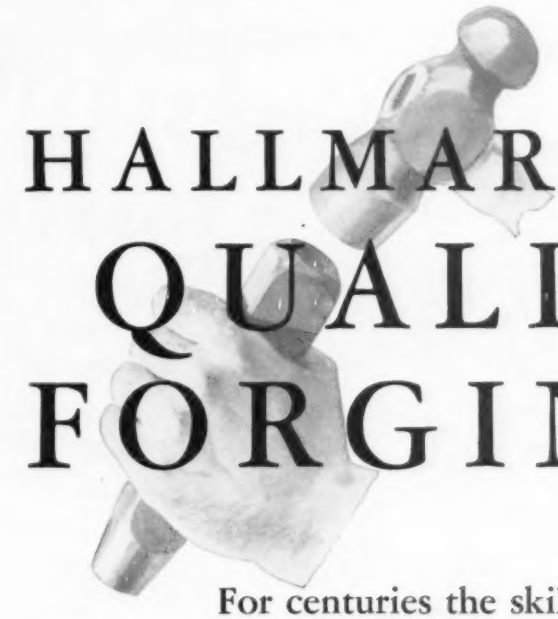
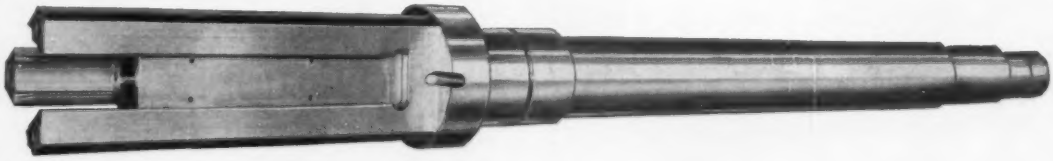


For centuries the skilled craftsman has shown his pride in his workmanship by identifying his work with a "mark".

The trade-mark of the National Forge and Ordnance Company stamped on your forging is your guarantee that the forging has been carefully and skilfully made to meet your specifications exactly.



NATIONAL FORGE & ORDNANCE CO.

IRVINE, WARREN COUNTY, PENNA.

NEW!

WATERBURY FARREL SLOTTER

"Model 5"

DELIVERS UP TO 51,840 (BURR FREE) BLANKS PER HR....

SLOTS STANDARD & SPECIAL SCREW HEADS, FERROUS OR NON-FERROUS BLANKS #6 TO ¼" DIA., UP TO 2½" LONG, AT VARIABLE SPEEDS FROM 60 TO 864 PER MINUTE.

ONE "Model 5" Outproduces TWO Earlier Type Slotters

The speed and work range of this completely new Waterbury Farrel slotter make it more productive than a *pair* of earlier type slotters which used indexing dials and saw-into-work sequence.

The "Model 5" has long and short run versatility, too. Its simplicity and rapid set up make it economical for short runs while its high speed pays extra dividends on long runs.

Inexpensive Tooling

The only tooling required is a saw and burr-remover blades made inexpensively from spring steel. One dial, furnished as standard equipment feeds the above range of blank diameters. Special dials can be furnished for other blank diameters.

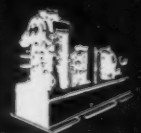
WATERBURY FARREL
Foundry and Machine Company
WATERBURY, CONN.

Branch Offices: Chicago • Cleveland • Millburn, N. J.

For further information, write for free bulletin or contact your nearest WF representative, today.

Bolt, Nut & Screw Machinery

Power Presses

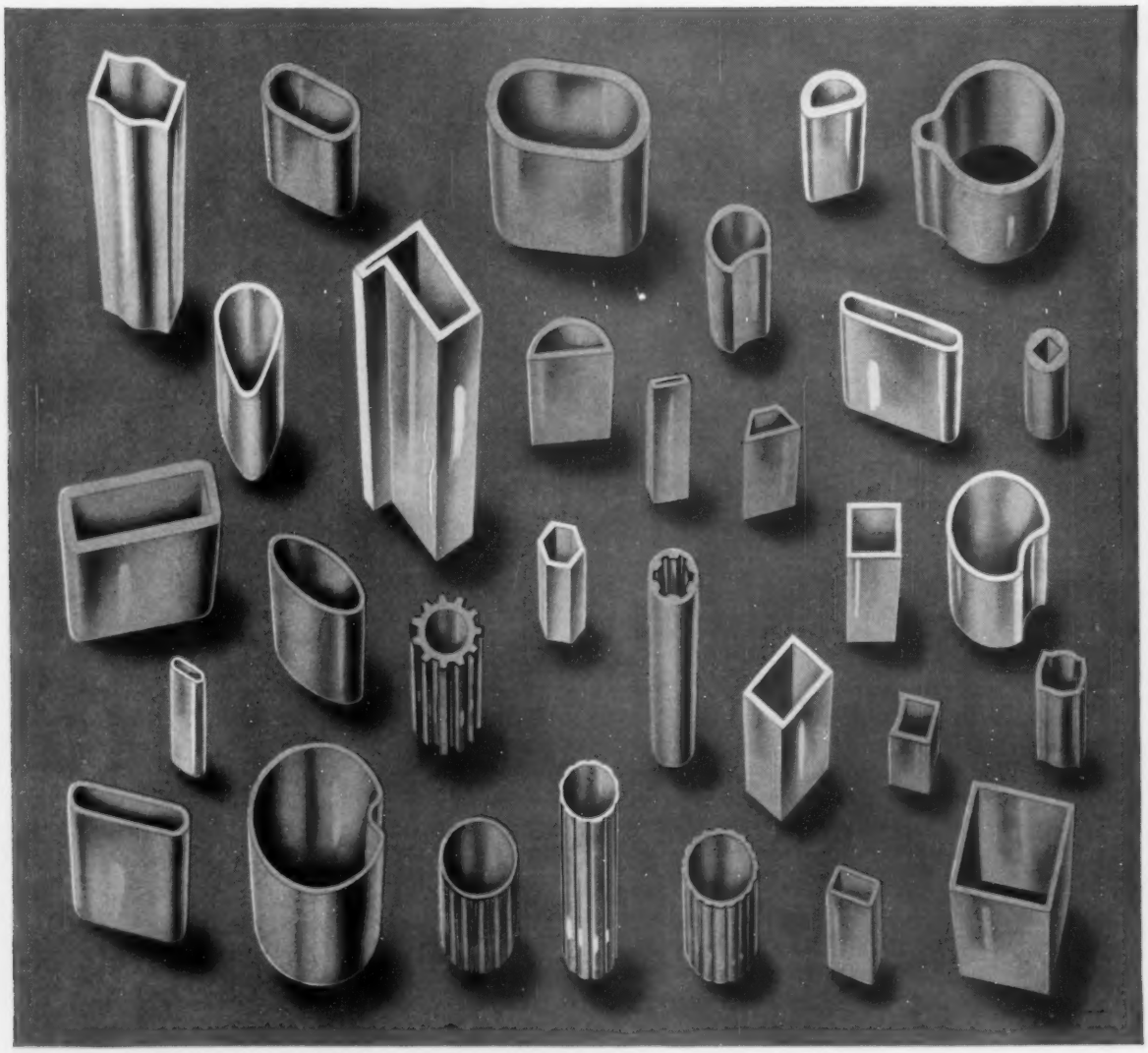

Rolling Mill Machinery

Wire Mill Equipment

Sendzimir Mills & Other Special Machinery

WATERBURY FOUNDED 1851 FARREL

A SHORT CUT TO A FINISHED PRODUCT



YOU NAME THE TUBE SHAPE AND THE METAL

Our specialized facilities and stock tools can save you time and money

Special-shape seamless tubes in straight lengths, or cut into short pieces, can save several steps in arriving at a finished product—can save you material and many direct labor costs. The American Brass Company's French Small Tube Division has turned out thousands of tubes in special shapes up to ¾" O.D. A variety of stock tools is available to save fitting-up charges.

For consumer products: Some special tubes are produced to the accepted commercial tolerances and finishes for such applications as electric fixtures, furniture ferrules, heat exchangers, radiator tubes, refrigeration controls, hardware, jewelry, automatic pencils, and a host of others.

High precision products: Many are made unusually accurate in I.D. and O.D. dimensions, with specially cleaned inside and outside surfaces, for parts for control instruments and for other scientific and industrial equipment.

Wide choice of metals: Special-shape tubes are available in copper, brass, bronze, nickel silver, special copper alloys, and aluminum — furnished in straight mill lengths or accurately cut to your specifications.

For action: See your American Brass Company representative or send in a sample, drawing, or description, together with the quantity you need, the metal, and other pertinent data. Address: The American Brass Company, French Small Tube Division, Waterbury 20, Conn.

ANACONDA®
SPECIAL-SHAPE TUBES

Dow . . . industry's most complete line of chlorinated solvents

DOW

DOW TRICHLOROETHYLENE

Each order brings you service
as efficient as the solvent itself

It's got to be quick to be good! Dow distributors . . . and their thousands of satisfied customers . . . know from experience that no other producer of vapor degreasing solvents gives more attention to *service* than Dow.

Three separate producing plants assure adequate *supply* of DOW TRICHLOROETHYLENE . . . and that's becoming particularly *important*. The six additional Dow shipping terminals mean that supply is *delivered* with dependable speed. And Dow distributors carefully maintain convenient warehouse stocks in all sections of the country.

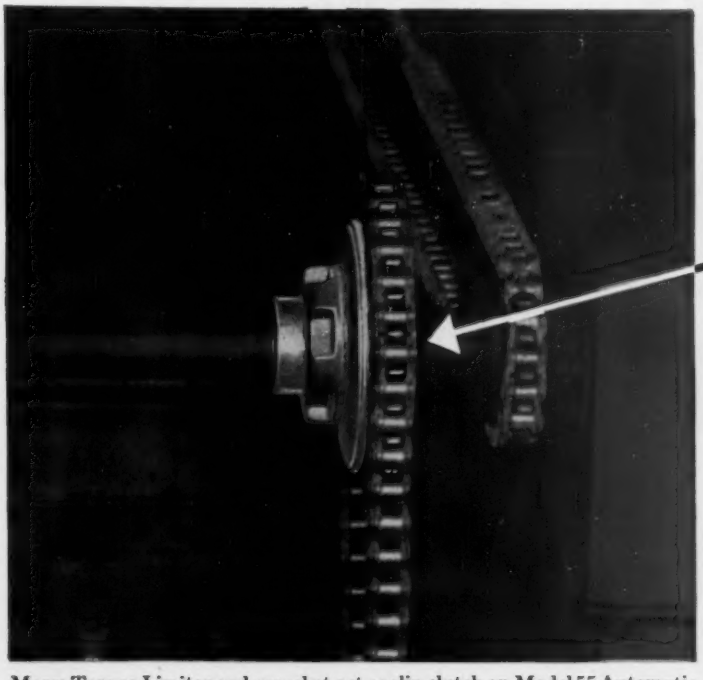
DOW TRICHLOROETHYLENE saves you concern and expense in other vital ways, too. This solvent's stabilized uniformity gives you a smoother, trouble-free operation. Its rugged "work horse" cleaning characteristics generally result in decided savings on cost per run. Well-qualified, up-to-the-minute technical assistance is available on request. Better check your trichloroethylene supply *today*. The same distributor you'll want to contact for DOW TRICHLOROETHYLENE can help with your specialized solvent needs, too; he also gives quick delivery on superior, high-boiling DOW PERCHLOROETHYLENE (Industrial), METHYLENE CHLORIDE and the wonderfully versatile, new *cold* cleaner, CHLOROTHENE*. For full information on any or all of these efficient solvents, why not drop a line to THE DOW CHEMICAL COMPANY, Dept. S 940A, Midland, Michigan.

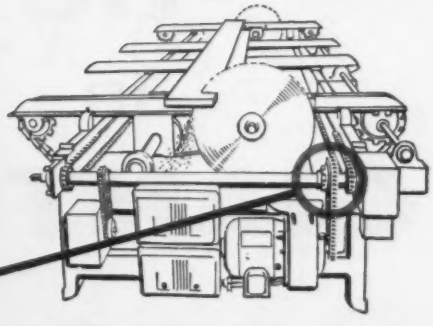
*Trademark

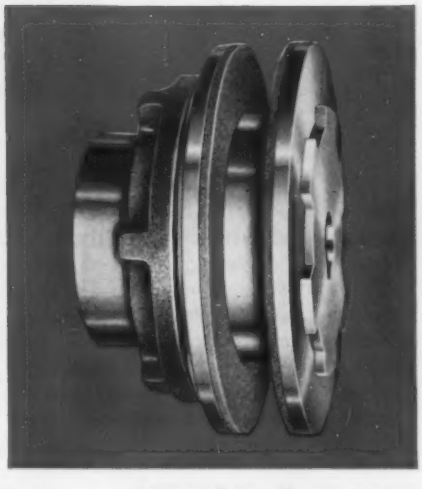
you can depend on DOW SOLVENTS

DOW

MORSE TORQUE LIMITER PROTECTS MOTOR AND REDUCER FROM DEAD-STOP OF DRIVEN UNIT!







Morse Torque Limiter and sprocket act as slip clutch on Model 55 Automatic Electric Shift Trimmer made by The Wheland Company, Chattanooga. Arbors are shifted at 120 fpm, instantly stopped and locked into place. Torque Limiter on jackshaft is set so sprocket slips when motor torque (38 ft.-lbs.) is exceeded. Absorbs inertia of 1-hp, 155-rpm gearmotor; reduces shock on drive unit when driven shaft is stopped.

Typical application shows how you can safeguard drive units and eliminate shear pins

Check these advantages of Morse Torque Limiters

- √ Eliminate downtime
- √ Torque-sensitive and fully adjustable
- √ Completely automatic and dependable
- √ Resume operation automatically
- √ Compact, standard sizes

In this Wheland Electric Shift Trimmer, two 200-pound saw arbors are automatically moved into position at 120 feet per minute . . . then stopped dead and locked into place.

The tremendous shock transmitted to the drive mechanism when the arbors are stopped, is safely dissipated by a Morse Torque Limiter used as a slip clutch between the driving and driven units. In addition, it prevents motor inertia from building up torque in the drive.

Versatile Morse Torque Limiters can safely control many of the shock-load problems present in your machine operations.

These simple devices are dependably sensitive and easily adjusted to desired torque limits. When overload or jam-up is cleared, they automatically resume operation, eliminating downtime or dismantling necessary with shear pins.

Send for Free Catalog

A full line of Torque Limiters is stocked by your Morse Distributor. For free catalog, or power transmission engineering help, see him or write today.

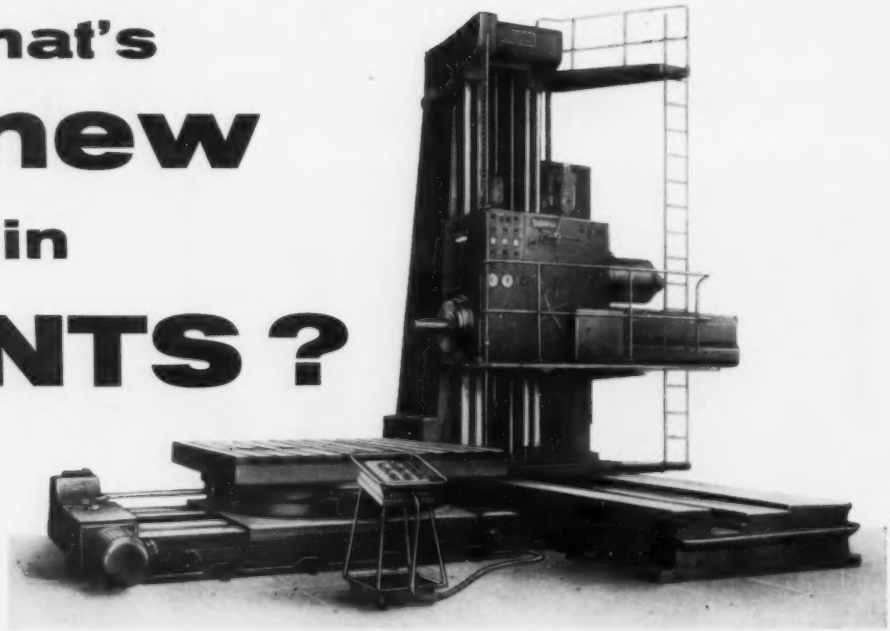
MORSE CHAIN COMPANY • INDUSTRIAL SALES DIVISION • ITHACA, N.Y.

MORSE

BW

CHAINS, CLUTCHES, AND COUPLINGS

what's new in GIANTS?



This 8⅜" SCHIESS model BF horizontal boring and milling machine . . . Now completely redesigned with many innovations. Here are a few . . .

Two individual drives—gear-drive for roughing, belt-drive for finishing. Belt-drive particularly suited to high-speed machining with carbide tools. New tool clamping device—does away with draw keys, hammers, drifts and binding screws. All spindle-slide movements controlled from easily accessible operating platform (or from pendant station or portable control panel, if desired). Special main-drive belt requires no readjusting. Column, spindle-slide and boring spindle may be adjusted at rapid traverse.

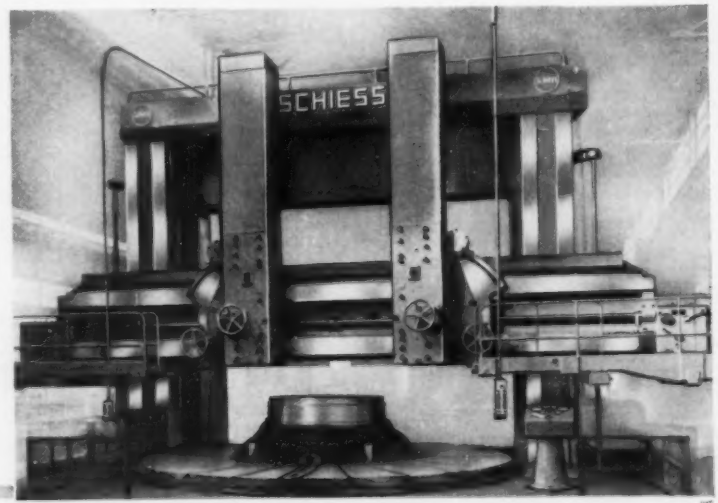
Spindle diameters, 6⅛" to 8⅜". Maximum diameter bored, 59"—faced, 79".

It takes Europe's largest builder of heavy machine tools, Schiess, to turn out giants like these. Parts and service as close as Pittsburgh. And an American Schiess engineer will be happy to help you size up these heavy producers for your heavy production needs. Write for catalogs and complete specifications on all Schiess BF and K models.

This 23 ft. SCHIESS model K vertical boring mill . . .

Look at all these new features—each one a time-saver! Rapid traverse motions with pushbutton control of changeover from feed motion to independent power traverse. Electro-mechanical locking of cross-rail to columns. Fingertip speed control—counterbalanced cross-rail and side-head—completely enclosed swiveling octagon rams—pendant control—automatic lubrication.

Turning diameters in standard sizes range from 8 ft. to 23 ft. (which can handle stock up to 100 tons!). Basic Schiess designs permit extra heavy machines, normally considered specials, to be built to your work diameter and load requirements. Even a diameter of 84 ft.!

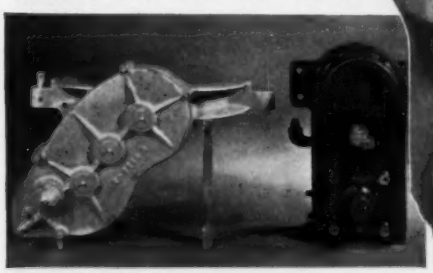


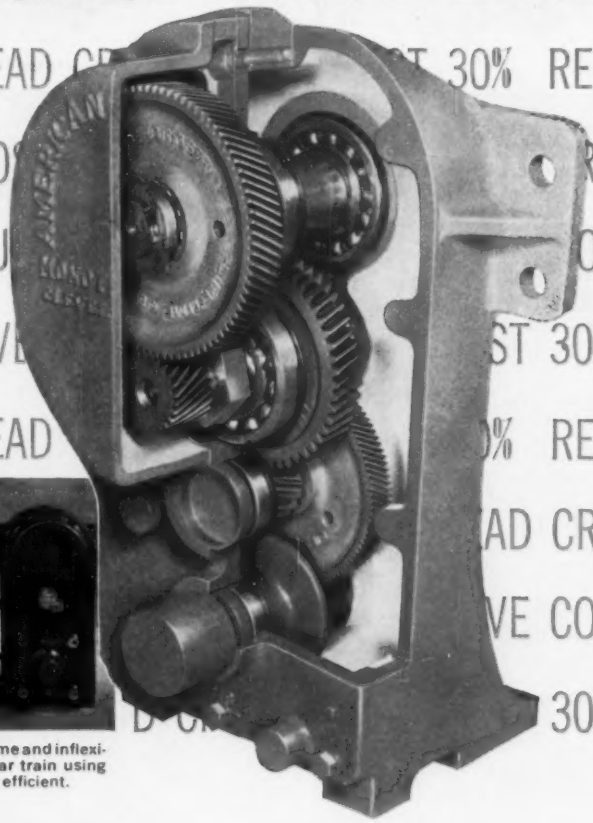
Engineering Division
AMERICAN SCHIESS CORPORATION
1232 Penn Ave., Pittsburgh 22, Pennsylvania

Sole Distributor
KURT ORBAN COMPANY, INC.
34 Exchange Place, Jersey City, N. J.

Duti-Rated Lifetime Gears

REDUCE OVERHEAD CRANE DRIVE COST 30%





Old gear train at left is large, cumbersome and inflexible. At right Foote Bros., designed gear train using Duti-Rated Gears—compact, light and efficient.

100% more capacity - 25% less weight - 28% less size

Ordinary commercial gearing in the traversing drive for an overhead, traveling crane system was bulky and had to be set at a space wasting 45° angle to save head room. Foote Bros. designed a special transmission system using Lifetime Duti-Rated Gears, permitting the application of smaller gears for the same capacity, allowing shorter center distances and a much more compactly designed drive.

The savings in space not only improved the design and performance of the overhead crane but also life expectancy. Maintenance requirements were greatly reduced. An outstanding feature of the new drive was that the Duti-Rated Gears could be interchanged on the same centers to change the ratios . . . allowing various speeds, fast and slow, for traversing.

This is only one example of what Duti-Rated Gears are doing in industry today. Extra gear capacity in less space . . . with longer life and lower costs . . . could be important to you, too. Call Foote Bros. today and learn all the advantages of Duti-Rated Lifetime Gearing . . . pre-engineered as standard or designed for your application. *FREE! Foote Bros. Engineering Manual "Duti-Rated Lifetime Gearing". Write for your copy today!*

This trademark stands for the finest industrial gearing made!

FOOTE BROS. Duti-Rated LIFETIME GEARING

T.M. Reg. U.S. Pat. Off.

FOOTE BROS.

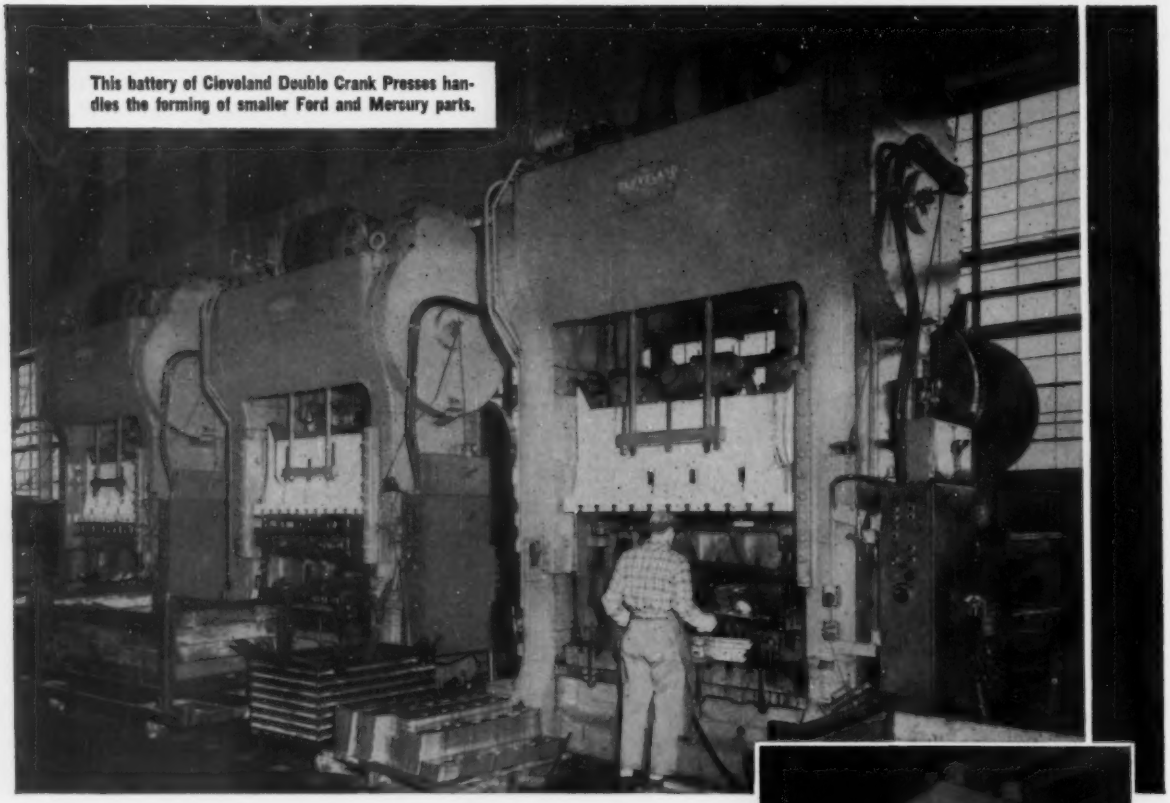
Better Power Transmission Through Better Gears

Foote Bros. Gear and Machine Corporation
4545 South Western Boulevard, Chicago 9, Illinois

CLEVELAND PRESSES

help Ford produce 120 carloads of stampings daily

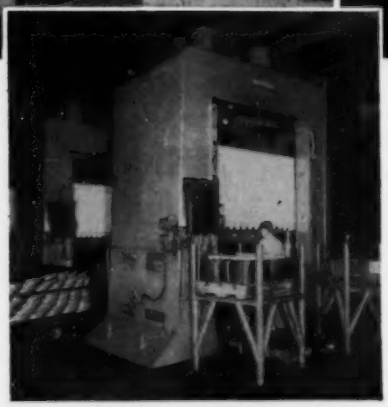
Ford's Cleveland Stamping Plant.



This battery of Cleveland Double Crank Presses handles the forming of smaller Ford and Mercury parts.

Since its completion in August of 1954 Ford's Cleveland Stamping plant has been producing Ford, Mercury and Lincoln parts at the rate of 120 carloads a day. Continuous part flow is essential to meet Ford's exactly scheduled assembly lines.

If you're interested in improving your stamping production be sure to check the many advantages designed into each of the 11 specialized types of Cleveland Presses. You'll find that new Cleveland Presses designed to your specific requirements will give you lower operating costs for greater profits. Write or call today.



Two Cleveland 450 ton Underdrive Presses head the production line forming Ford package trays.

THE CLEVELAND PUNCH & SHEAR WORKS CO.

Established 1880

POWER PRESSES – FABRICATING TOOLS

E. 40th & St. Clair Avenue, Cleveland 14, Ohio

Offices at: NEW YORK • CHICAGO • DETROIT
PHILADELPHIA • E. LANSING

CITY FOUNDRY DIVISION • SMALL TOOL DEPARTMENT

AUTOMATION SHEFFIELD

AND
AUTOINSPECTION
SYSTEMS, CIRCUITS
AND CONTROLS
HAVE BEEN OUR
BUSINESS FOR
MORE THAN A
DECADE. IT
WILL PAY YOU
TO CHECK YOUR NEEDS
AGAINST SHEFFIELD
EXPERIENCE

WRITE DIV. 510 FOR BULLETIN NO. AU-1154

THE SHEFFIELD CORPORATION
DAYTON 1, OHIO, U.S.A.

MASTER CRAFTSMAN GOLDEN ANNIVERSARY HEADQUARTERS

SHEFFIELD
manufacture and measurement for mankind

7153

1. Gaging cylinder bores for selective assembly
2. Controlled honing of gear blank bores
3. Automatic gage for 100% inspection of small arms ammunition
4. Connecting rod inspection
5. Controlling the grinding of ball bearing races
6. Post-process size control of bearing races
7. In-line inspection of automobile part
8. Controlling 12 grinding machines
9. Controlling bore size of pinion blanks
10. Automatic gaging of crankshaft main bearings

you needn't be big to get attention at CRUCIBLE

Even baby-sized orders get special attention at Crucible . . . *because they're important to us.* The fact is, most of our warehouse business is devoted to serving the small steel user efficiently and economically.

That's why, when you need quality special steels in *any* quantity – or just some help with an application, you can be sure of a real welcome at Crucible. *We're big enough to serve you . . . small enough to want to.*

Stocks maintained of:

Rex High Speed Steel . . . ALL grades of Tool Steel (including Die Casting and Plastic Die Steel, Drill Rod, Tool Bits, and Hollow Tool Steel Bars) . . . Stainless Steel (Sheets, Bars, Wire, Billets, Electrodes) . . . Max-el, HY-Tuf, AISI Alloy . . . Onyx Spring, Hollow Drill Steel and other special purpose steels.

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Crucible Steel Company of America

General Sales Offices, Oliver Building, Pittsburgh, Pa. Branch Offices and Warehouses: Atlanta • Baltimore • Boston • Buffalo • Charlotte • Chicago Cincinnati • Cleveland • Dayton • Denver • Detroit • Houston • Indianapolis • Los Angeles • Milwaukee • Newark • New Haven • New York • Philadelphia Pittsburgh • Providence • Rockford • San Francisco • Seattle • Springfield, Mass. • St. Louis • St. Paul • Syracuse • Toronto, Ont.

Black & Decker® Portable Grinders are POWER-BUILT FOR EASIER HANDLING!

We don't buy motors—we build them!
The heart of your electric tool is the motor—completely built by Black & Decker. All the power you need and then some—because each motor is built for a specific tool and the job it must do. B&D motors always stand up!

Power-Built B&D Portable Grinders help maintain peak operating efficiency because they're designed with the operator in mind! New, improved design gives up to 85% more power with less weight. Steel wheel guards are completely adjustable for any desired position. Exhaust air is directed away from operator.

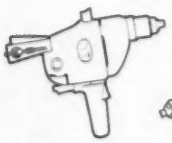
Longer life is another important feature of B&D Portable Grinders. Full size ball bearings . . . at extreme ends of wheel spindle . . . absorb all side thrusts. An enclosed compartment keeps abrasive dust away from the switch. Improved ventilation . . . forced air flow . . . prevents dust and dirt from accumulating. Gear mountings are splined . . . steel inserts are provided for spindle bearings.

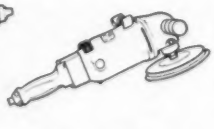
B&D Portable Grinders are available in 3 models ranging from 2½" to 6" in wheel diameters. See your B&D distributor or write: THE BLACK & DECKER MFG. CO., Dept. 7802, Towson 4, Maryland.

Service... one of 42 B&D service branches is located "next door" to you; to give you fast, expert service!

Look in the Yellow Pages under "Tools-Electric"

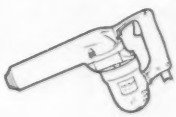
B&D Black & Decker®
PORTABLE ELECTRIC TOOLS


DRILLS—32 models


SANDERS—6 models

VACUUM CLEANER

SAWS—5 models


HAMMERS—4 models

SCREW DRIVERS—6 models

The Record's Clear . . .
you save money with every turn
of the screw with
AMERICAN PHILLIPS

It's true — you can save up to 50% of your total fastening costs by switching to American Phillips Head Screws.

And the more complex your assembly — like a modern three-speed, high fidelity record player — the more you can save in every way. You save in faster assemblies because American Phillips are faster to drive than slotted screws. You save by cutting rejects of marred finished surfaces because the driver can't slip out of an American Phillips.

What's more, you get the famous American quality and the precision American deliveries that keep fast-paced assembly lines on schedule. *Whatever* you fasten, you can put American Phillips to your profit at every turn.

Like proof? Write.

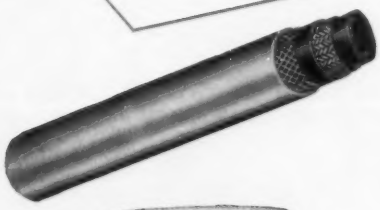
✕ *marks the spot . . . the mark of extra quality*

AMERICAN SCREW CO.

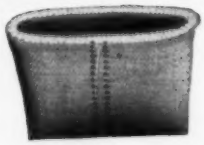
PHILLIPS HEADquarters
WILLIMANTIC, CONNECTICUT

Plants at Willimantic, Conn. and at Norristown, Pa.
Warehouse and office at Chicago
Office, Detroit, Michigan

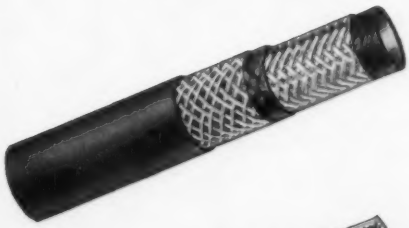
For long, trouble-free service . . .
use Quaker hose



AIR Extra lightweight, highly flexible hose for heavy duty work. Resists weather damage and abrasion. Non-porous tube of oil resistant rubber compound. Rugged Neoprene cover. Ideal for almost any hose installation.



FIRE Resilient, flat-folding hose saves space and gives long service in interior fire protection. Highly flexible and resistant to cracking. Leak-proof tube bonded to strong single jacket cover. Recommended for institutions, offices, ships, etc.



STEAM Many times stronger than wrapped fabric hose for general steam-handling jobs. Also lighter, more flexible and kinkproof for easier handling. Steel wire and glass reinforcing insures extra safety. Resists high pressures up to 388° F.

WELDING No twisted, tangled lines. Two lines are securely bonded together to form a single, safe hose unit. Kink-free and resistant to welding gases. Stands up to lots of dragging across rough surfaces. Especially effective on portable welding dollies.

WATER For long wear and outstanding value, this easy-to-handle hose has what you need. Reinforced with multiple plies of high tensile yarn, it takes higher than usual working pressures. Cover stands up to weather extremes without cracking or peeling.

Save time and money. Call your Quaker-Quaker Pioneer distributor first, *when you need hose or other industrial rubber products. You'll find him prompt, dependable.*

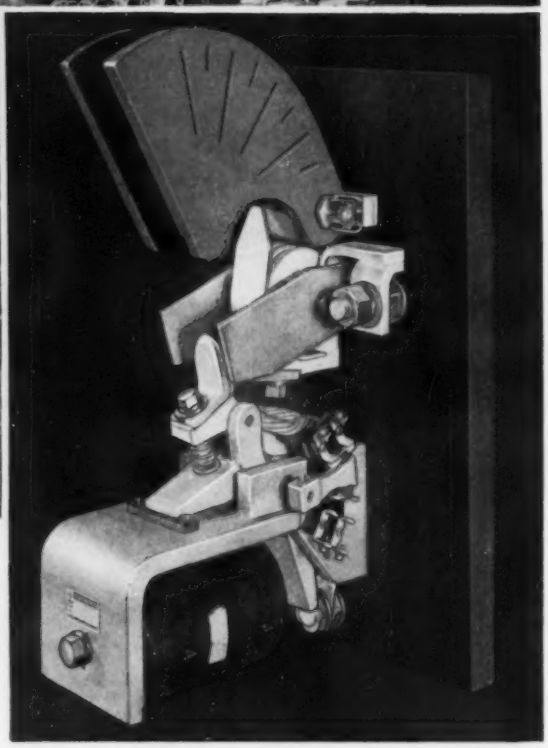
DIVISIONS OF HKP H.K. PORTER COMPANY, INC.

H. K. PORTER COMPANY, INC.

QUAKER RUBBER DIVISION
Philadelphia 24, Pa.

QUAKER PIONEER RUBBER DIVISION
San Francisco 7, California

Where Severe Duty IS NORMAL DUTY



HANDLES REPEATED OVERLOADS WITH EASE

Extra overload capacity . . . extra durability and reliability have been built into this heavy duty contactor — to make your roughest dc drive a smooth running, precision operation . . . to assure maximum production and quality with a minimum of outage time and maintenance. Principal component on the Allis-Chalmers constant potential panel, the Type 260 dc contactor is a rugged unit engineered to withstand punishing current surges inherent in steel mill auxiliary drive operation.

Here's Why!

● **Quick quenching minimizes contact burning** — Arc centering blowout uses thermal convection and magnetic action to stretch, cool and extinguish arc. Rapid circuit interruption minimizes burning and pitting of contacts.

● **All current-carrying parts silver to silver** — Main contacts are high density forged copper, plated with silver for dependability and extended life. Auxiliary contacts are solid silver . . . need no dressing.

● **Magnet coil designed for continuous duty at 110% of rating** — Coil layer wound with insulation between layers . . . vacuum impregnated to resist moisture and abuse. Operates contactor at less than 80% of rated voltage when hot. Holds at 20% of normal voltage.

● **Other features.** Rolling contact action. Arc handled on tips, current on clean heels . . . no destructive scuffing. Design simplicity eliminates troublesome linkages, arms and pivots. Lifetime *Oilite* shaft bearings need no lubrication. A-4326

SIMPLIFIED ROUTINE INSPECTION

Keeping the Type 260 contactor in top operating condition is merely a matter of preventive maintenance through routine inspection. All components are readily accessible. Arc chute lifts off to expose contacts which may be removed by loosening one bolt. Auxiliary contacts are mounted on contactor frame in full view. Operating coil is held by a single bolt.

For complete information, call your nearby Allis-Chalmers representative or write Allis-Chalmers, Milwaukee 1, Wisconsin.

ALLIS-CHALMERS

NEWSFRONT

Government May Probe Scrap

Investigators for the House Small Business Committee are now compiling information which the members will use to decide whether to hold a public airing of the scrap problem. Probers are interested in the shortage and price of scrap, and what effect exports may have on either or both. So far, the investigators are said to have compiled "some very interesting information."

Dishonesty Piles Up Big Bill

Losses to business and industry from employee dishonesty are mounting at an alarming rate. Value of money, merchandise and materials stolen last year may reach $500 million. Honesty insurance losses paid by insurance firms increased from $5,616,431 in 1944 to $16,456,877 in 1954. Specialists attribute much of increase to a tight labor market which results in less careful screening of employees, and loopholes in company internal control systems.

How To Win Friends—

Further evidence of GM's softening attitude toward its dealers is revealed in the announcement that the corporation will provide a new $1 billion group insurance program for dealership owners. It'll give coverage up to $200 thousand for individual dealers. One object of the move is to combat some of the unfavorable publicity on the dealer level.

There's A Profit Angle In Slag

Long a headache to steel mills, slag may soon develop into a profitable material. Several steel companies — and independent firms — are actively studying ways of making better, more profitable use of the material. It's already established in some fields, notably the concrete and fertilizer industries.

Answer To School Shortage?

Made of light-gage interchangeable steel members, and all-bolted construction, a new 6000 sq ft grade school building accommodates 150 children. Structure was framed in less than 30 days, completed in less than 90, and required no basement or foundation work. Weight is about one-fifth that of a conventional school. Cost: Less than the lowest-cost school in area.

Promise Of Faster Nitriding

Recent test results may prove useful in speeding up expensive and prolonged commercial nitriding cycles. It has been determined that temperatures at or about the temperature of magnetic transformation and the Curie point have a catalytic effect on the rate of nitrogen adsorption. This effect has been obtained on electrolytic iron, low-alloy steels and nickel-cobalt alloys.

Low-Cost Atom Training Tool

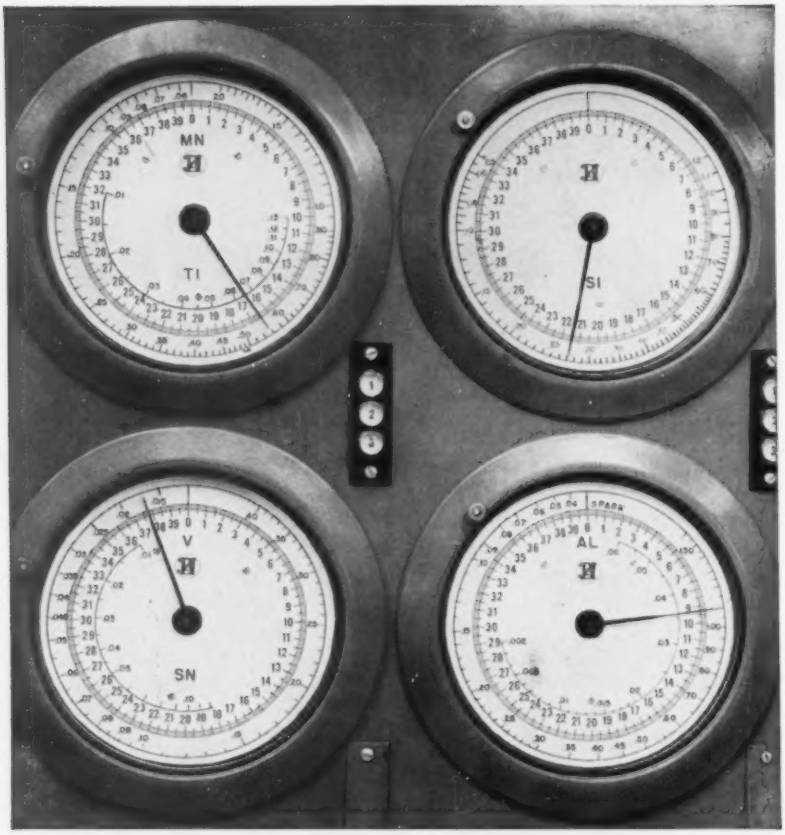
Colleges anxious to train graduate scientists and engineers in atomic energy, but unable to afford costly research reactors, are showing a lot of interest in a Nuclear Reactor Simulator. A single analog computor, it duplicates electronically the performance of any full-size reactor. Virginia Polytech is first among the reactor-less colleges to acquire one.

Get Less Porosity In Shell Molded Valves

Hydraulic flow valves for lift trucks, which handle pressures up to 2000 psi, are being made successfully by shell molding. An Ohio industrial truck parts supplier using the process claims that valves have smoother walls for better oil passage. Even more important is the reduced porosity under this high pressure.

Setups Allow More Machining Time

Complete machining setups, prepared ahead of time on plates that fit the machine tool beds, give equipment more time to make chips at one progressive shop. Program got underway when the firm found that its machine tools were actually working only about 10 to 15 pct of each shift, due to short runs and frequent, tricky setups. Cutting time is now nearly 50 pct for most tools and still climbing.



We see what's in TIMKEN® steel while we make it, to give you greater uniformity in your forgings

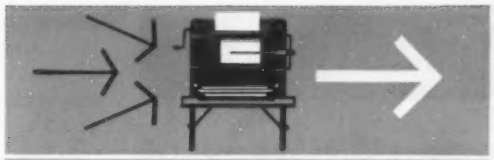
YOU see above four of the twelve spectrometer dials used to analyze steels being melted at the Timken Company. In just 40 seconds this direct-reading spectrometer tells the exact chemical composition of a heat of Timken fine alloy steel. Results are flashed back to the furnace so the melter can keep close control of the analysis. This carefully controlled chemistry produces uniform composition from heat to heat. You can be sure that forgings made from Timken® forging steels will give you uniformly high ductility and resistance to impact.

And because your order of Timken forging steel is handled individually in our mill we are able to target our conditioning procedure on your particular forging requirements. This minimizes your rejects.

Here's an added plus: Timken steel forging bars *save* you steel because their good dimensional tolerances produce uniform weight multiples with a minimum of steel lost in flashings. Get all these results in your forging steels. Specify Timken forging steels. The Timken Roller Bearing Company, Canton 6, Ohio. Cable address: "TIMROSCO".

YEARS AHEAD—THROUGH EXPERIENCE AND RESEARCH

SPECIALISTS IN FINE ALLOY STEELS, GRAPHITIC TOOL STEELS AND SEAMLESS TUBING



PLASTICS: Time For Another Look

Plastics have outgrown the "wild oats" phase . . . Industry adopting standards and weeding out fly-by-nights . . . Metal firms getting into the act . . . Dollar volume approaching $2 billion—By *T. M. Rohan.*

◆ ARE PLASTICS worth a second look?

The tales of plastic pipe that burst the first time under pressure; containers that melted when warm liquid was poured in, and raincoats that stiffened and cracked still haunt a few plastics salesmen. Most of the objections date back to wartime substitutions turned out by marginal producers in a day when anything would sell, especially when it replaced allocated metals.

But plastics of today are far different. With a recent influx of big companies from other fields, the industry has taken on new responsibility and respectability. Specifications and comparative standards, never before available, are being worked out by industry committees. Improper applications are being weeded out. New applications would dwarf the imagination of inventor John Wesley Hyatt of Albany, who developed celluloid in 1868 when a billiard ball manufacturer staged a contest for a new material, after ivory became in short supply.

Market

In the plastic pipe business, deep inroads are being made into normally metal pipe markets, especially in handling acids and corrosive liquids, industrial waste and salt water. Three big steel companies have already entered the field including U. S. Steel, Republic, and Youngstown Sheet and Tube (temporarily withdrawn) and there are a host of other independent extruders and processors, many larger.

Another new outlet for plastic pipe is conversion of irrigation pump engines from liquefied petroleum gas to natural gas. One recent order for this application was for 800,000 ft or about 150 mi of 2-in. pipe. A farm cooperative will tap a nearby natural gas main and lay the pipe directly to their small pumping engines. Because of low cost of natural gas and other economies, these systems pay for themselves in 1-2 years.

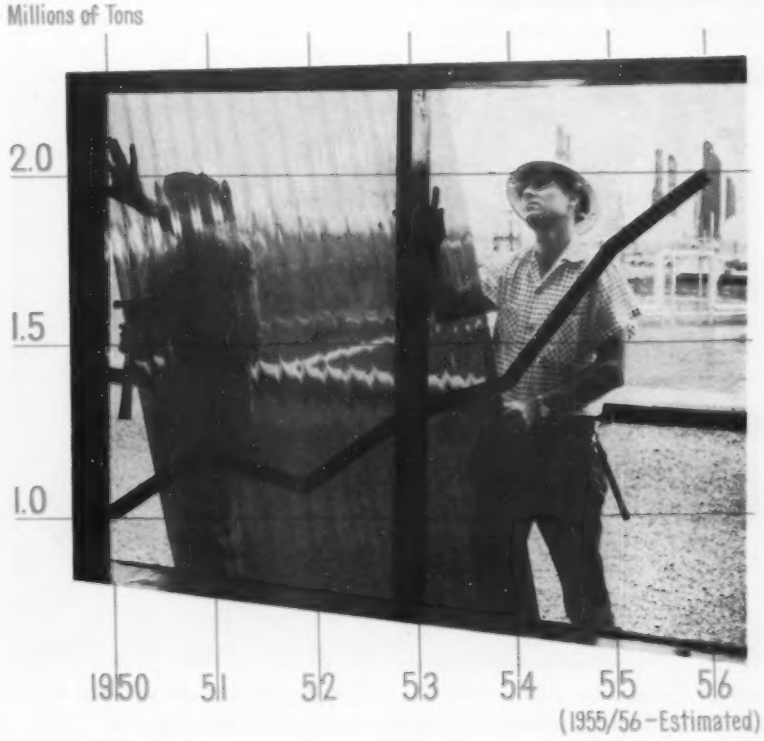
Farmers are laying pipe themselves by the mile. With only a jackknife and a screwdriver, they can cut and fit the pipe into connectors in a matter of minutes. Rural farm watering systems and jet pumps represent about 65 pct to 70 pct of the market.

This market and a bulging new one in natural gas transmission and distribution systems will push pipe producers to the limit.

Expected overall increases in plastic pipe this year run as high as 25 pct.

J. E. Winick, sales director of

Plastic Uses Climb



Triangle Conduit and Cable Co., New Brunswick, N. J., last year was up 8 to 10 pct in dollar volume and 15 pct in unit sales. The slip in percentage dollar sales to unit sales was due to a price decline.

Market Trend

Entrance of larger companies into the extruded plastic pipe field is having a stabilizing effect, according to G. H. Reed, American Hard Rubber Co. plastics manager.

Productionwise, the industry has registered gains every year except for a slight decline in 1952 and this year is expected to top the 2-million-ton mark for the first time. Dollar volume of last year's output of 1.8 million tons was $1.8 billion, according to the Society of the Plastics Industry.

Groups like the Society of the Plastics Industry are attempting to raise the level of research, efficiency and new products through financing studies at institutions like Battelle in Columbus, O., and through industry conferences. A series of such meetings on materials and techniques will be held at the Seventh National Plastics Exposition and Conference, June 11-15 in New York.

While metalworking may sacrifice some markets to plastics, it is gaining a host of others in furnishing extrusion machinery, diemaking machines, machine tools, dies and fixtures. Fifty-eight U. S. equipment and machinery manufacturers belong to the association, and with a 30 pct increase last year and more coming this year, a promising market is assured. Even steel producers furnishing steel for dies are members.

Proposed Standards

Dies used in forming plastics are some of the most intricate and expensive known. They cost generally between $1500 and $7000 depending on size, number of cavities, etc. And plastic dies for short run metalforming, especially in aircraft and housewares, are on the upswing.

In the booming plumbing field, plastic pipe is developed into a multi-million dollar business. While many are still reluctant to use plastics, based on early sad experience, usage is now climbing fast. The Dept. of Commerce, Commodity Standards Div., is polling the industry on a proposed set of standards covering wall thicknesses, inside diameters, weights per 100 ft, etc., for 10 nominal sizes of the most popular flexible polyethylene. Other groups involved are the Society of the Plastics Industry, American Society for Testing Materials and the Thermoplastic Pipe Standards Assn. which formulated original standards.

Possibly the heaviest impact of plastics on an established industry has been in electric wiring where they are a totally new insulating material whose characteristics can be adjusted chemically and easily color coded. In tests by the B. F. Goodrich Chemical Co., plastic coatings have shown no effect after 3 years under water and cables have not deteriorated after 3 years' earth burial.

Chemical Uses

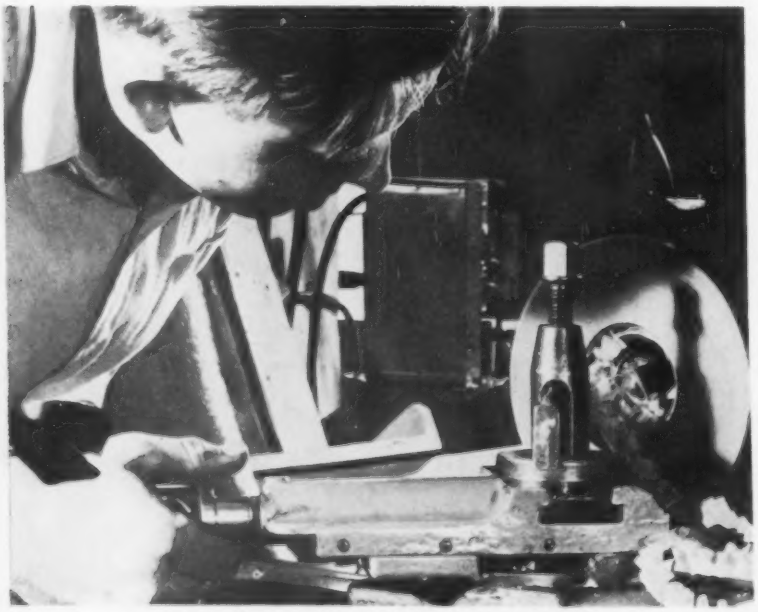
Another major field is handling corrosive liquids within industrial plants.

"The chemical, chemical handling, and food processing industries have been looking hard at the problems of in-plant handling and out-of-plant shipping, and have been rapidly moving to the adoption of plastic materials," says Dr. J. A. Neumann, president and director of research of the American Agile Corp., Cleveland. "Because of this, such applications present one of the most important potential markets of the plastic fabricators."

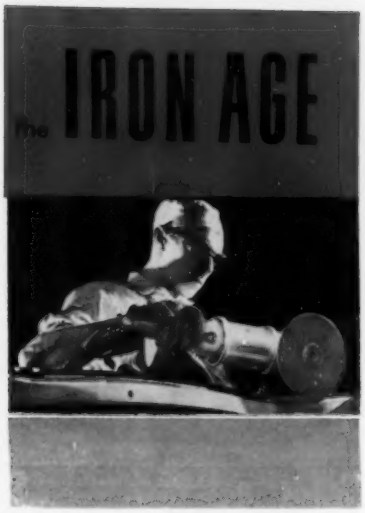
Chemical Switch

This can best be pointed up by the recent switch by a chemical company from a 58 lb lead vessel for handling hydrofluoric acid to one weighing 5 lb, at one-third the cost, made of polyethylene. What makes the plastic even more attractive are the fracture and dent-free qualities of the polyethylene and its ability to withstand rough treatment.

And plastics, for the most part, can be fabricated with the same ease as metals; cast, extruded, molded; and finished with equal ease.



PLASTICS can be worked with the facility usually associated with metal. Rigid vinyl being machined can also be sawed, drilled and extruded.



SPECIAL REPORT

POWER TOOLS: A Battle Rages

Makers of air and electric power tools wage hot battle over industrial market . . . Users benefit . . . IA survey show swing to pneumatic—By G. J. McManus.

◆ KEEP AN EYE on portable tools. Makers of drills, nut runners, grinders and other power tools are waging a hot battle for the industrial market.

New torque controls, special multi-spindle assemblies and a raft of attachments are being offered. Electric and pneumatic models are being pushed by competing manufacturers.

Behind the contest are two factors. First, there has been a big jump in the use of portable tools. Sales, which were a little under $100 million in 1947, will probably hit $200 million by 1957. High labor costs have industry searching for new ways to put power tools to work in production, maintenance and shipping jobs.

Secondly, the industrial market is in a highly fluid state. Electric tools, which had the inside track prior to 1940, were challenged by the pneumatic type in World War II. A recent IRON AGE survey of 106 plants indicates a definite swing to pneumatic over the past 10 years.

Why and Wherefore

Here's the way things shape up: There are three basic types of electric tools—universal (60 cycle); high cycle (180 cycle); super cycle (360 cycles). The super cycle and the high cycle are strictly production tools. The universal has gotten a big play in the home and small shop market. It is also being offered and being used in heavier models for industrial use.

Pneumatic tools are either the rotary or the piston-and-cylinder type. Rotary tools are used for drilling, nut running, grinding and similar operations. The piston type is used for percussive operations such as chipping, peening and riveting as well as for squeezing operations, where the tool must provide backing for the riveted piece.

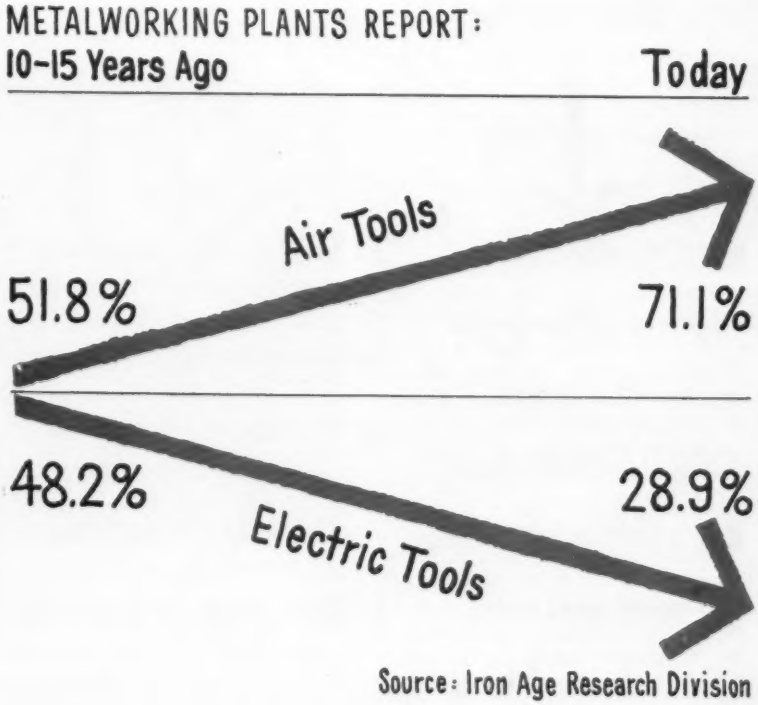
There is no universal agreement on tool applications, but in general either pneumatic or the high and super cycle electric tools seem to be favored for steady production work. Air tools are preferred in percussive work. The high and super cycle seem to have an edge in grinding operations. In drilling and nut running operations, there is disagreement on relative performance showings of pneumatic and electric.

Universal electric tools have the big advantage of requiring no auxiliary equipment. They can be plugged into ordinary electric sockets, require no special converters or compressed air systems. In the eyes of some, this feature more than compensates for any other advantages of high cycle or air.

Breaking down the considerations in portable tool operation, here's what you get:

Weight: In THE IRON AGE sur-

Portable Tool Trends



vey, 22 companies preferred pneumatic tools because they said they were lighter. The weight factor becomes more critical as you get into heavier work. One plant uses electric drills for work up to ½ in., pneumatic tools for anything over ½ in.

According to a manufacturer of tools, the heaviest weight one man will carry for steady work is 10 lb. Chicago Pneumatic's 6-in. portable grinder weighs 5 lb per horsepower in the pneumatic model, 15 lb per horsepower in the universal electric model.

To answer this weight objection, electric tool makers offer high cycle and super cycle models. These can deliver more power than the same weight universal motor. They make it possible to build a tool with enough power for heavy duty work and still keep weight within acceptable limits.

At Chicago Pneumatic, the 6-in. super cycle model weighs 3 lb per horsepower; the high cycle, 7 lb per horsepower (against 5 lb for pneumatic and 15 lb for universal).

At Black & Decker in Baltimore, they offer a strong dissent to these conclusions. The company feels it is possible to build enough power into a universal tool for production work and still keep weight within acceptable limits. The company cites the experience of plants using universal tools for production work, says it is not necessary to take on the added expense of air or special cycle tools.

Cost

Initial cost of a compressed air system is roughly $150 to $200 per horsepower. That includes compressor and pipe. Tool requirements range from about ¼ to 5 hp.

The frequency converter or motor generator for special cycle operation costs about ⅓ to ½ as much as an air compressor.

Tool prices will vary according to the type of work to be done—heavy duty, standard or light. For a heavy duty drill of ¼-in. size, prices of air and special cycle models are about the same; price of the universal drill is at least $25 less.

DRILLING tool of Black & Decker has Universal electric motor, can be plugged into ordinary electric line.

Operating cost of pneumatic tools is highest. On the basis of a 60 pct load factor (which is high), the average pneumatic tool takes about 1400 cu ft of air per hour with air costing about 10¢ per 1000 cu ft. Operating cost of electric tools is considerably less with local rates determining the exact figures.

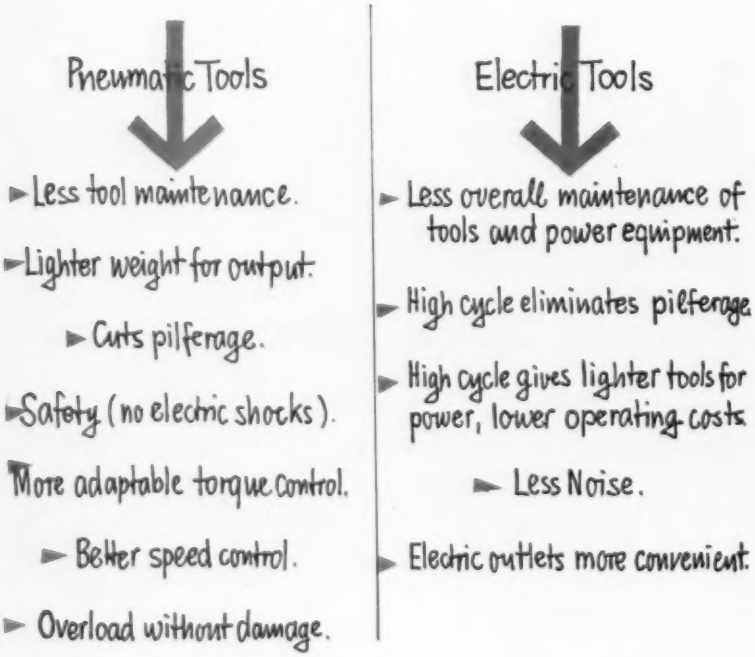
On the matter of operating costs, two manufacturers felt these were a negligible matter alongside wage rates. If labor costs $2 or $3 an hour and a tool can cut an hour off the job, the tool is paying for itself. Performance is the main thing.

Maintenance

In THE IRON AGE survey, 30 companies said pneumatic tools required less maintenance. A large manufacturer of air tools heartily endorses this view. He pointed to the fact that air tools can be overloaded and stalled without damage, says they stand up better.

One user, however, said that performance of pneumatic tools suffered unless considerable care was given to keeping lines clean and dry. He conceded that proper maintenance would eliminate difficulties but was not optimistic about getting the shop to provide adequate care.

Why Users Prefer:


Pneumatic Tools
► Less tool maintenance.
► Lighter weight for output.
► Cuts pilferage.
► Safety (no electric shocks).
► More adaptable torque control.
► Better speed control.
► Overload without damage.
Electric Tools
► Less overall maintenance of tools and power equipment.
► High cycle eliminates pilferage.
► High cycle gives lighter tools for power, lower operating costs.
► Less Noise.
► Electric outlets more convenient.

Regarding trouble with special cycle electric tools, one plant felt this could be reduced if voltage fluctuations were controlled. High cycle motors will overheat if voltage strays outside fairly narrow maximum and minimum limits. This particular company felt that a motor generator was more satisfactory than a converter in keeping voltage level. However, converters are more commonly used.

In general plant maintenance, universal electric tools are popular because they can be run anywhere.

Speed

Pneumatic and universal electric tools lose speed steadily as load is increased. High cycle and super cycle do not. They run close to maximum speed until they fall off abruptly near the stalling point.

This feature of the special cycle is most important in operations where a tool works under a sustained load. In grinding or other abrading operations, therefore, the special cycle tools offer faster production.

In other tool jobs, the speed lag does not seem to be critical.

Pilferage

In THE IRON AGE survey, 10 companies preferred pneumatic tools because they were less likely to be stolen than universal electric. Five companies favor high cycle over the universal for the same reason.

Pilferage is undoubtedly a consideration. One aircraft company figures on losing one ¼-in. drill out of three each year. But other companies felt losses could be controlled with a reasonable amount of checking. And with so many garages now equipped with compressed air, pneumatic tools have to be watched closely, too.

Noise

Two companies in THE IRON AGE survey gave noise as their objection to pneumatic tools. Air tool makers are conscious of this problem. They have reduced the decibel rating of tools but concede that pneumatic tools are still noisier than electric.

Special Work

Pneumatic tools can be adapted to a variety of special production jobs. Ingersoll-Rand for one is going in very strongly for multi-spindle jobs. These big units, which qualify as portable tools only because they hang from chains, will tighten 9 or 10 nuts at a throw in automotive or other volume operations.

Pneumatic screw drivers in very small sizes are being used extensively in the assembly or radio and electrical components. In addition to their lightness, the air tools have the advantage of not interfering with any radio testing.

The manager of pneumatic sales for one big tool company felt that the distinction between air and electric tools lay in this matter of specialization.

"Electric tools are a standard, mass-market item," he said. "Pneumatic tools are specialty items, designed with special handles, special attachments and special leads for particular jobs."

This may be an oversimplification but it is true that pneumatic tools are more easily adapted to special functions. When you start getting into extra spindles and special attachments with electric tools, you run into a weight problem.

NUT RUNNER of Ingersoll-Rand Co. tightens five lug nuts at the same time. Multiple spindle pneumatic tools of this kind are finding wide use in production operations.

SQUEEZING tool of Chicago Pneumatic Tool Co. uses compressed air and piston action for aircraft assembly. Tool must provide backing.

Power Control

Two companies in the IA survey felt they got better speed control with pneumatic than with electric tools. In an operation like chipping, a third company said the man could control his work better with an air tool.

The question of controlling torque on nut runners by means of air pressure is an open one. At Chicago Pneumatic, they felt that system pressure varies too much for precise control. The company has come out with a device called a "one-shot" clutch to provide positive disengaging when a nut has been tightened to the proper torque.

Ingersoll-Rand has come out with a torque control mechanism that shuts off nut-running tools when the required torque limit is reached (IRON AGE, Jan. 26, p. 76). Device runs nut within 10 to 15 pct of total variation or 7½ pct of a certain mean torque value.

Other manufacturers are offering their own answers to the problem of torque control. Loose or stripped nuts and bolts are an old headache in high-speed assembly operations.

The growing role of portable tools in production work figures to bring more of the precise, automatic controls.

STEEL: Are We Losing Ground To Reds?

Free World is 'way out front in steel capacity . . . But Red nations are gaining . . . Our edge is offset by greater diversion of Iron Curtain steel to war . . . Russia uses steel as economic bludgeon—By *Tom Campbell.*

◆ THE REDS are creeping up on the Free World in the race for steel supremacy. True, the United States and her allies make far more steel than Russia and her bloc. But that isn't the whole story. And behind the whole story lurks the real danger.

Stop a bit and realize that in the Iron Curtain countries there is always an increase each year. There are no industrial business cycles. You produce or else.

Ten years ago Russia and her friends made about 19 million tons of steel. Last year these countries produced more than 69 million net tons of steel—an increase of 256 pct over 1946. And still the trend is sharply upward.

The Free World made about 104 million tons of steel in 1946 but last year they turned out 225.3 million tons—an increase of 116 pct over 1946. The trend here is upward but not at the same rate as in the Iron Curtain countries.

Steel For War

What about the argument that we make far more steel than do the Reds? It holds water, but just so far. Most of the steel made by the Free World goes for a higher standard of living—into civilian goods, gadgets, equipment and building.

In the Communist countries most steel goes for the war machine or for the machinery and building to support a war economy. Internally they use more steel for defense (or war preparation) than we do.

High steel output is not necessarily a prerequisite to starting or supporting a war. Germany started a war when she was making 20 million tons of steel against 124 million tons being turned out by major allied countries.

Japan jumped into a war when she was making no more than 7.5 million tons of steel per year. The significant point being made here is that Russia and her cohorts are making a bigger and bigger percentage of world steel output.

Are We Slipping?

In the first post-war year Russia and other Iron Curtain countries made but 16 pct of the world's steel. The Free World at that time made 84 pct of the total. Last year Russia and her allies turned out 23 pct of the world's steel while the Free World's share had dropped to 77 pct of the total.

Does the United States continue as the strong factor in the Free World's steel activity? Yes, strong; but she doesn't quite hold the position one might suppose. Our steel output has been increasing substantially over the years but we have had our peaks and valleys while the Red countries have continued their gains.

Ten years ago steel output in this country was 66.6 million tons. Last year all previous records were broken when 117 million tons were poured. That was an increase of 76 pct over 1946 output. On a percentage basis, the Free World, other than the United States, went ahead faster than we did during that time.

True, the rest of the Free World had a smaller base upon which to start in 1946 because of the ravages of war. But it is significant that Russia, which made 15 million tons of steel in 1946, produced 49.6 million tons last year—a gain of 230 pct in a 10-year period. This is all the more telling because Russia suffered extensive war damage, also.

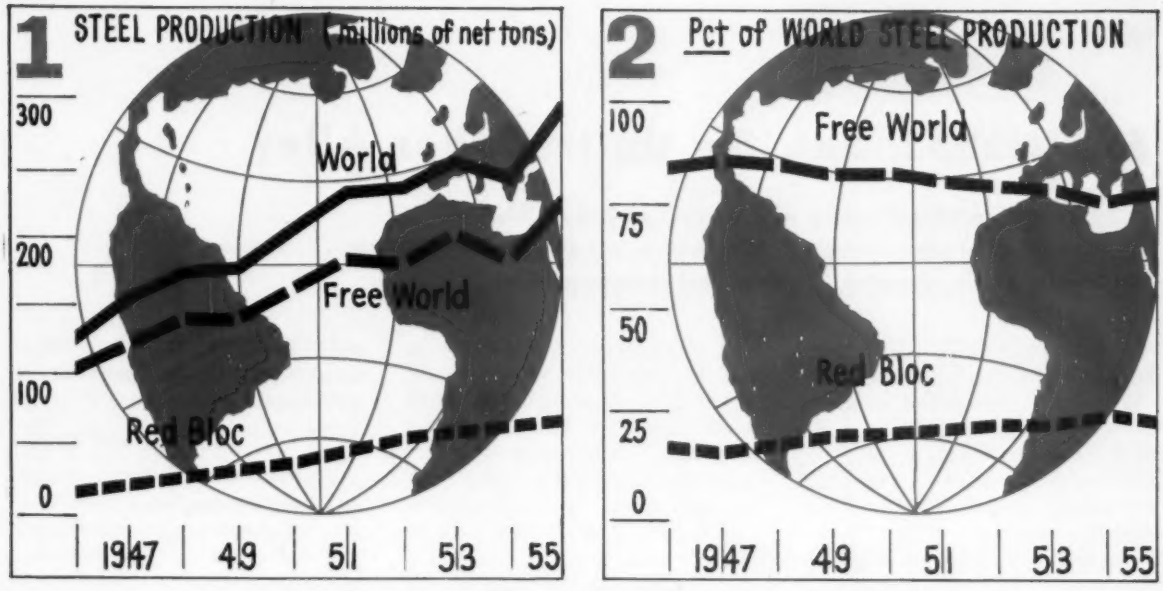
Headaches Ahead

Of much greater import is the cold hard fact that in the first year after World War II the United States turned out 54 pct of the world's steel while last year we made 40 pct of the total. With steel output increasing in Iron Curtain countries, and in the Free World nations other than us—the percentage of U. S. production to the world's will probably continue to decrease.

Does all this mean that we are losing the battle of steel? We aren't losing it but there are new headaches ahead for us. Russia and her allies are building a strong war machine—or at least an economy that will produce and support her attempt to gain world domination.

Her efforts may not come by way of war. As the Russians increase their steel output—and industries that depend on steel—it means the Free World faces a new economic threat. With extra steel, the Russian-Chinese Axis can bargain and trade with countries for things it needs to become much stronger.

If we should falter at some time in the future, Russia would be able — as Malenkov planned before he was ousted — to throw more steel into its consumer market as a sop to her people. Any-



"Three Ways to Look at it"

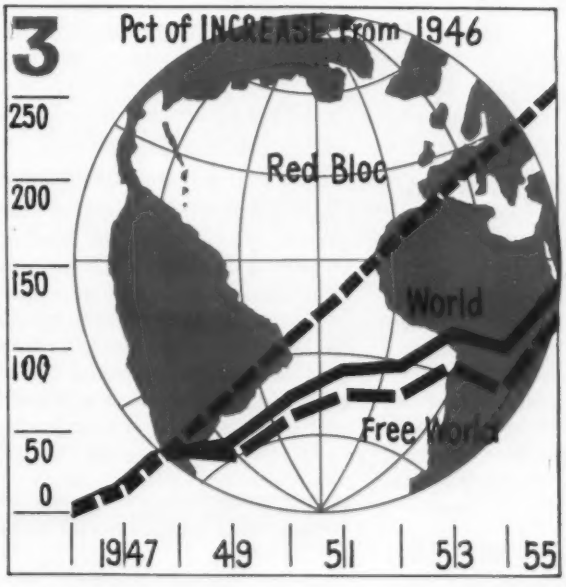
thing that is "new" or is a gain means much to the Russians even though it means little; or looks small to us.

Russia's plan as she becomes a greater power will be to toss the monkey wrench into our free economy, and as often as she can. One way will be an expansion in her present activity—offering aid and materials to those countries which may be on the sidelines in the cold war. A stronger steel economy would aid and abet this.

Russian Strategy

By 1960 the Russians will be pouring close to 77 million net tons of steel. Our probable output will be 140 million tons—if we have no deep depression. It is true that we can turn our vast steelmaking capacity to win a war if it is foisted upon us. Chances of isolated Korean type wars are much greater than a world war. Russia is rapidly reaching a position where she can—by remote control—egg others on in "nuisance" wars.

Looking into the future, the wisdom of the steel industry's expansion is crystal clear. This gigantic plan is a great move for peace and our standard of living. But it is also the bulwark of our defense against broad and subtle moves by the Red Bloc countries.



Our excess or "reserve" has always enabled us to catch up and overtake aggressors in the past. We had to have the "edge" to catch up. World steel output figures are not as comfortable today as they were 10 years ago.

Strong Economy Needed

The defense of the Free World may not take as much steel for actual weapons and materiel as it used to. But it will require, in the years to come, much larger amounts of steel for auxiliary machinery, buildings and supporting equipment. Defense also requires a strong civilian economy.

A realistic appraisal of Russian technological progress indicates that the Reds are farther ahead than some people thought—in steelmaking and fabricating.

Threatened Communist aggression in whatever form means—we must keep abreast of the world steel race.

STAINLESS: Set 'Em Up In Other Alley

Stainless steel producers set a new all-time record in '55, look for another good year ahead . . . Warehouses are still biggest customer . . . Autos are largest single consumer . . . New applications growing.

◆ RACK UP ANOTHER big year for stainless steel. An industry that seems determined to grow out of its britches set a new all-time production record in 1955, and looks forward to a year that "at worst" will be slightly under the '55 peak.

American Iron and Steel Institute reports that 1955 output was 1,191,177 net tons, more than 40 pct over 1954 production and significantly above the 1,049,077 tons poured in the previous record year of 1953.

Producers happily point out that that record represents continuing new market gains for stainless in addition to reflecting last year's general high steel demand. The 40 pct boost in stainless output is notably greater than the 36 pct rise in overall steel output.

While nickel stainless continued to be the most popular grades, the straight chromium grades accounted for almost half of total production last year. Output of the chromium 400 series totaled 518,472 tons, while the combined 300 series and the new 200 series totaled 648,161.

Warehouses Number One

But the 400 series shows a general increase in output above the average 40 pct for all types, reflecting growing acceptance of the straight CR grades. Type 430 rose 56 pct over the previous year type 416, 50 pct, and type 410, 51 pct.

Increases for the 300 series included a 59 pct rise for 301, a lower boost of 24 pct for type 304 and an above-average rise of 57 pct for 316.

Warehouses continue the stainless steel industry's best friend. Official AISI figures on stainless and heat resisting shipments by market classifications will not be available until probably late this week, but IRON AGE estimates show that stainless shipments last year ran about 670,000 net tons. Of this total, warehouses accounted for over 180,000 tons or about 27 pct.

Largest single consumer is the automotive industry, which last year bought about 140,000 tons or 20 pct. Of this, roughly 98 pct was cold-rolled strip. Recent easing of Detroit's steel demand has somewhat slowed this market, but the automakers have indicated that they intend to make even greater use of stainless.

Machinery Market

A traditional and growing still-growing stainless market, the machinery, industrial equipment, and tools classification last year took about 38,000 tons of the metal. Metalworking equipment, valves and chemical, petroleum and food processing equipment are significant consumers in this category, and stainless is becoming the standard material in many cases for all new installations.

Architectural Market

The aircraft industry continues an important market, especially in view of defense requirements and new orders for civilian transports of advanced design. Use of honeycomb sections in particular is cited as giving a major boost to stainless.

Architectural applications are eagerly watched by the industry. Already a good market (21,000 tons last year), it could well develop very quickly into one of the very largest tonnage consumers. Stainless producers believe that higher use is almost inevitable for both interior and exterior applications.

Atomic energy looms as one of the brightest hopes. Allegheny-Ludlum comments, "atomic energy has always been an excellent market and certainly should become far better through growing civilian installations."

Households Go Stainless

Second largest stainless market was the appliance, utensil and cutlery classification, which last year consumed about 47,500 tons, mostly in household utensils and table flatware. This market will almost certainly loom even larger in the future. Stainless kitchen utensils are dominating their field, and one large New York department store reports that stainless utensils accounted for about 69 pct of all utensils sold.

Stainless table ware has definitely established itself on the American homefront, and as such is one of the industry's best ambassadors to the general public. Indicative of this area's growth is the addition of 25 new patterns within one year to the stainless flatware index put out by *Jewelers' Circular-Keystone*, bible of the industry. Cutlery is a growing market, but some makers are still reluctant to pay for the proper grade for this use.

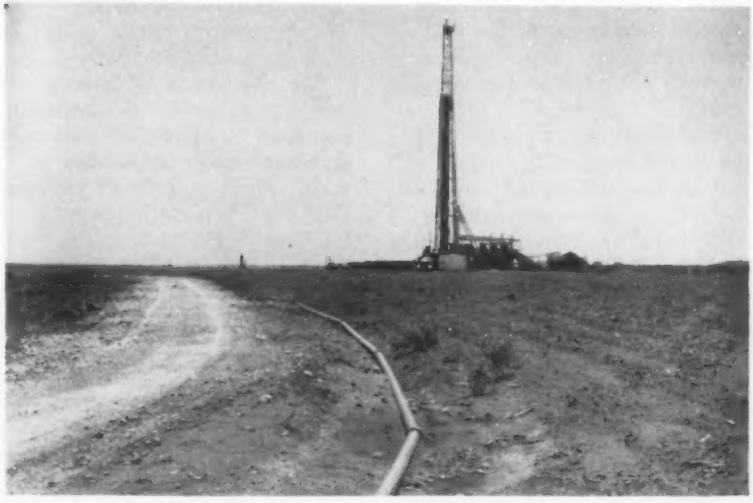
Hottest potential in this classification, however, is the appliance industry. Stainless toasters, percolators, waffle irons, etc., are a familiar sight.

ALUMINUM: It's Going After Oil

National distribution agreement between Reynolds and National Supply points up aluminum's place in oil country . . . Similar arrangements between steel and oil foreseen . . . Market potential—*By G. G. Carr.*

◆ ALUMINUM PRODUCERS are training their sales sights high on the lush oil country market. The light metal has been winning friends and applications in the oil fields for some time now, and producers feel that aluminum is firmly established in the industry as a basic material.

Highlighting the prominence of aluminum in the nation's oil and gas industry is the recent national distribution agreement between Reynolds Metals Co. and National Supply Co. Under this agreement, National Supply will market aluminum oil country pipe and will also stock aluminum couplers and fittings, enabling their stores to supply complete aluminum pipeline systems. It seems just a matter of time before other producers establish similar marketing arrangements.



ALUMINUM pipe stretching across Texas plain supplies water to an oil well drilling rig. Line consists of high-strength welded aluminum pipe connected by detachable couplers. Kaiser Aluminum Co. photo.

Aluminum applications have been largely limited to gathering lines and other applications at the well head and at refineries, and where low pressures are encountered. In certain types of soils, aluminum has shown good resistance to corrosion. Also, where difficult terrain and other factors make the use of steel pipe difficult, aluminum has been used to advantage.

The petroleum industry's metal needs traditionally form a tasty market. The industry must expand to stay alive, and the world-wide search for new oil reserves adds to the demand for more metal. In the first 11 months of 1955, for example, the oil and gas industry used almost 5 million tons of steel, or almost 7 pct of all shipments of finished steel products, according to American Iron and Steel Institute. And most of this was high-grade, costly material. To competing metals — principally aluminum — the sales prospects are hot indeed.

Aluminum producers are relatively unconcerned that their product is more costly than steel on a pound-for-pound basis. Aluminum's inherent advantages, they insist, more than compensate for an initially higher cost.

Cost Relationship

A prime advantage is light weight and resultant speed and economies in handling. In a recent demonstration in Texas, aluminum pipe for temporary oil, gas and water lines was installed and picked up about 10 times as fast as steel pipe of comparable dimensions.

On overhead river crossings, aluminum needs a maximum of only one-third the weight of steel pipe of the same capacity. This is an outside figure; aluminum needs are often as low as one-eighth those for steel.

Of perhaps equal importance to light weight for the oil men is aluminum's corrosion resistance. The light metal's ability to resist severely corrosive atmosphere of many types makes it a natural for many oil country installations. The high sulphur content of sour crude oil poses a major corrosion problem for steel in many applications. Where sour crude is handled, it is becoming almost standard practice to make tank decks, hatches, internal supporting structures, vent lines, and other fittings of aluminum, which shows little if any adverse effects from exposure to the sulphur compounds. Aluminum Company of America reports it has had aluminum tank roofs for sour crudes in service for over 20 years in locations where steel roofs have failed in 5 years.

To the engineer, reduced fluid friction through aluminum pipe is a most attractive feature. Scale is less of a problem.

RESEARCH

LAB: Why Measure to The Millionths?

Sheffield facility checks gages and other instruments to the millionths of an inch . . . Has practical function to industry from auto engines to precise guided missiles . . . Duplicates U. S. service.

◆ IT WILL TAKE fantastically precise tolerances to produce an intercontinental ballistics missile with an accuracy of 5 miles at a range of 1500 miles.

Manufacturers of guided missile parts and supersonic aircraft will get an assist from the new Sheffield Corp. laboratory. Dedicated this week, the new Eli Whitney Metrology Laboratory is the first U. S. industrial laboratory specifically built to measure and legally certify accuracy of master gage blocks, threads, contoured parts and the like to an accuracy of one-millionth of an inch.

Duplicates Bureau

Sheffield, a veteran producer of precision gages, machine tools and dies, duplicates in its new $250,000 laboratory, facilities of the U. S. Bureau of Standards.

The Bureau is at present the only existing U. S. laboratory equipped to handle all phases of measurement in millionths of an inch. While it will do measurements for private industry, waiting time is generally six to eight months, since direct defense work has priority and time devoted to private industry must come from the Bureau's primary function of pure research. In duplicating some of the Bureau's functions, Sheffield also provides a defense bulwark as a secondary source.

An illustration of the usefulness of the facility is a recent check job on master gages for an automobile company. A production line for cylinder blocks had been set up based on tolerances of one-millionth in., based on master gages being used.

Good Results

Exhaustive measurements at Sheffield indicated tolerances were actually 2.5-millionths, since the original gages were inaccurate. As a result, a new production line is being installed, resulting in a closer tolerance, higher efficiency engine.

Since .1° C will change the size of a 1-in. block of steel by one-millionth in., elaborate laboratory construction methods were utilized to assure constant temperature. Walls are 8 in. thick with a double floor separated by 4 in. of cork. Temperature of the room is controlled to one-twentieth of a degree.

Among the tools in the laboratory are a prewar German Koester interferometer liberated from a German salt mine. It is capable of measuring a 2-in. steel block to an accuracy of one-millionth in. A later development of this type of instrument is a Zeiss Opton interferometer. This makes absolute, differential and comparative measurements on gage blocks to 4 in. in length with readings to the seventh decimal place.

Another development in Sheffield's allied machine tool line is a new unit now in production for measuring forged auto connecting rods. The unit will automatically measure center distance, and the amount of twist and deflection. If beyond allowable limits, it will apply hydraulic pressure to straighten them, re-check the properties, and re-straighten a second time if necessary.

That's Slicing It Thin

Measurements which can be checked at Sheffield Corp.'s Eli Whitney Laboratory:

Part	Dimensions checked	Certified accuracy
Gauge blocks English or Metric	Length, parallelism, planeness	0.000002 to 0.000005 in.
Plain and taper plugs and rings	Diameter, total taper, Roundness	0.000005 in. of dia. 0.000002 in. roundness
Master setting plugs and rings	Diameter, taper, roundness	plus/minus 0.000005 in.
End Measuring Standards to 20 in. round, pointed or flat ends	Length	0.000005 in. per in. to 8 in.
Cylindrical and tapered parts	Diameter, taper, roundness of internal or external, Cylindrical or tapered parts	To establish standards or blueprint specifications. Internal roundness to 0.000002 in.
Thread gauges for straight and taper thread plugs and rings	Half angle, lead error, taper, major and minor diameters	A.S.A. Federal and American standards B1-2
Precision Threaded Parts	Pitch diameter, lead, angle, major and minor diameters, all types	Calibrated and Certified
Thread Measuring Wires	Diameter, straightness, roundness	H-28 Handbook Screw Thread Standards
Surface plates, flat parts	Flatness	0.00005 in.; Precision elements to 0.000002 in.
Contoured parts	Contours	Established standards or blueprint specifications

Ships:

New Navy construction brings $166 million to yards.

Private shipyards on the Atlantic, Pacific, and Gulf coasts are taking part in new Navy contracts amounting to more than $166 million for construction of seven destroyers and three frigates.

Awards are made for these vessels as part of the fiscal 1956 shipbuilding program of the Navy. Remaining to be contracted for under this program are one submarine, two ammunition ships, two escort vessels, two inshore minesweepers, five patrol vessels, and ten landing craft.

Sharing in the destroyer-frigate construction are Bath Iron Works, Bath, Me.; the Bethlehem Steel Co. shipbuilding division, Quincy, Mass.; Puget Sound Bridge & Dredging Co., Seattle; and Ingalls Shipbuilding Corp., Pascagoula, Miss.

Coast Yards Share

Bath Iron Works is to build three destroyers at a total fixed price of $48.6 million, including preparation of working plans. The Bethlehem Steel Co. yard will build three frigates for $52.4 million, including working plan preparation.

Puget Sound Bridge & Dredging and Ingalls Shipbuilding are to construct two destroyers each. The former is to be paid $32.8 million and the latter $32.4 million.

Navy issued a total of 20 invitations to bid on these contracts and received 12 bid proposals. Awards were placed with the lowest bidders for each group of ships.

Air Sonic Squawks

Armed forces claims officers, not Congress, have the primary responsibility for settling claims for windows broken or plaster cracked when military jet planes crash through the sound barrier.

Congress has had a number of complaints from householders and businessmen about damages done to their properties by the "sonic boom."

The Air Force recommends that a person who wants to collect payment for damages attributable to one of its planes report to the claims officer at the nearest Air Force base. If there is no base in the immediate vicinity, the complainant should write to the claims officer at USAF headquarters, Washington.

Claims against the Navy are to be reported to the nearest Navy facility. Complainant will be given claim forms to complete, and the base commander will investigate the complaint. Claims of not more than $1000 each may be paid by the naval district commandant, while larger claims may require a special appropriation.

Waste:

Pentagon moves to unload surplus property.

Important changes in the policies governing military real estate and surplus property disposal are in the making at the Defense Dept.

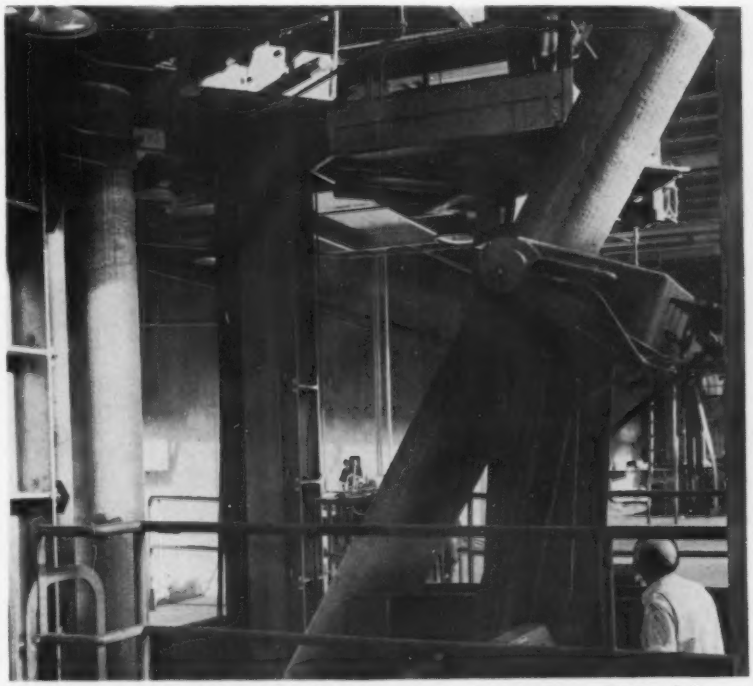
The Pentagon, having weighed the Hoover Commission recommendations on real property management, may soon request Congress for authority to replace high-priced real estate with holdings that are adequate but less expensive. It may also ask that it be permitted to dispose of real property at fair market value.

Cash to Treasury

Expected result of the first request, if approved by Congress, would be to allow the military to sell some of its holdings to commercial or industrial enterprises when the market is high. Part of the returns would be used for other property suitable for military needs.

Balance of the proceeds would go into the miscellaneous funds of the U. S. Treasury. This action, says the Pentagon, would increase the government revenue.

If Congress agrees to the second proposal now considered, other U. S. agencies would be allowed a 20 pct discount in buying military property. All other buyers would pay fair market value.



ALUMINUM billet being hoisted by an ingot charger from direct chill casting is 20 ft long, 20 in. in diameter, and weights 7000 lb. It was formed and will be worked in the heavy extrusion press plant being operated for the U. S. Air Force by Kaiser Aluminum at Halethorpe, Md.

EXPANSION IN INDUSTRY

Plastics:

Borg-Warner to build new W. Va. plant

Borg-Warner Corp., Chicago, has appropriated $10 million to insure getting its share of booming plastics demand. The company will use the money to build a new plant for producing a thermoplastic resin called Cycolac recently developed by its Marbon Chemical Div.

The new operation will be erected on a 322-acre site near Washington, W. Va., recently purchased.

Individual buildings will be dispersed over about half the area. A substantial section will be devoted to facilities for applying color to the plastic.

According to Borg-Warner president Roy C. Ingersoll, the expenditure is significant of the company's confidence in plastics.

More Trailers

Truck-trailer manufacturers are gearing for a production increase that will sharply boost their demand for aluminum, steel, nickel, and copper during the next four years.

Freight trailer output will probably average 97,000 units annually in that period, compared with 78,500 in 1955, predicts Dr. Marvin J. Barloon, Western Reserve Univ., Cleveland. His survey of production prospects was made for the Aluminum Company of America and is disclosed through the Truck-Trailer Manufacturers Assn.

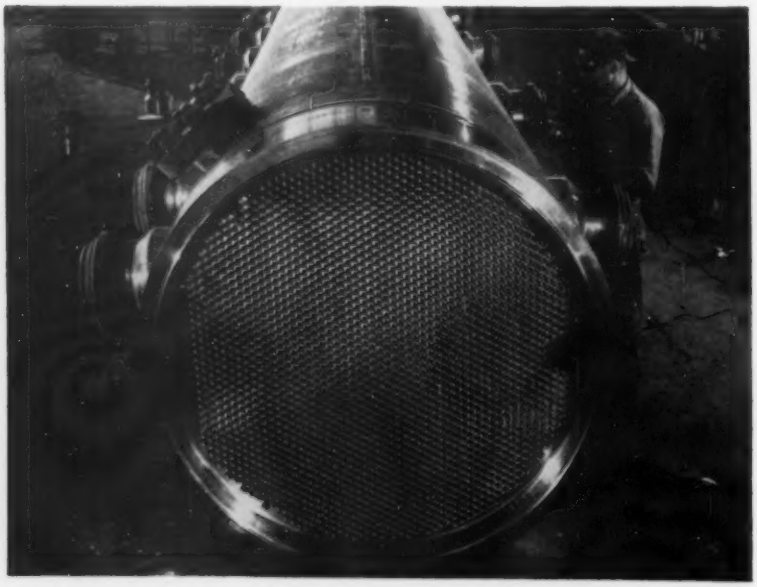
Looking ahead to 1970, Dr. Barloon foresees nearly 1.3 million trailers in highway use, an increase of more than 85 pct over the 700,000 in service during 1955. As intercity movement of freight by trailer advances, he says, the number in operation by 1975 may top 1.5 million.

Requirements for trailers will not be significantly boosted by the movement of loaded units aboard railway flat cars, Dr. Barloon contends.

Producers need more and more tight-supply metal. George Davis, deputy director of the automotive division, Business and Defense Services Administration, says the industry used about 41 million lb of aluminum in 1955 and will doubtless require more this year.

Wheeling Earnings

Earnings of Wheeling Steel Corp. in 1955 and 1954 were $17,296,000 and $9,596,000, respectively, instead of $86.7 million and $74.1 million as reported in issue of Feb. 9.



STEAM generator-heat exchanger for first civilian nuclear power plant at Shippingport, Pa., was built at Carteret, N. J., works of Foster Wheeler Corp. It is part of 60,000 kw Westinghouse nuclear power plant.

Expansion Briefs

National Gypsum Co., Buffalo, N. Y.; new plant at Westwego, La. nearing completion; capacity —enough gypsum products for 50,000 homes annually.

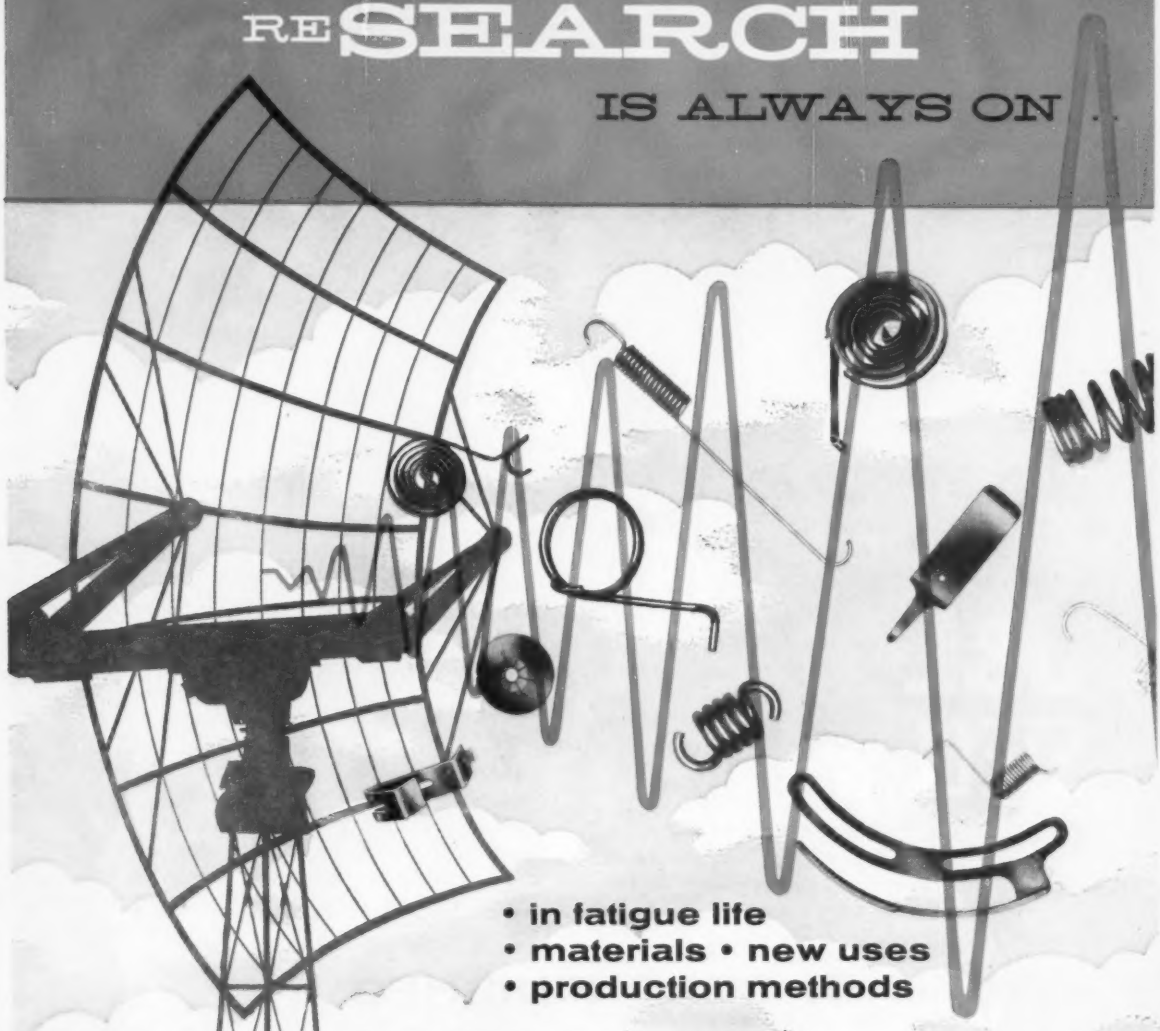
Selas Corp. of America, Philadelphia; manufacturers of heat processing equipment; consolidating research, manufacturing and administration in new building north of Philadelphia.

Page-Hersey Tubes, Ltd., and **The Steel Co. of Canada, Ltd.**; Joint enterprise to build new mill to produce Canada's first "big inch" pipeline; mill cost $10 million.

Solar Aircraft Co., San Diego, Calif.; new engineering office and laboratory for gas turbine research.

Mathews Conveyor Co., Ellwood City, Pa.; new plant and office for Canadian subsidiary at Port Hope, Ontario.

RESEARCH
IS ALWAYS ON . . .



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REPORT TO MANAGEMENT

How's the Consumer Taking It?

There is a tendency to look at a few points in the economy and lapse into such phrases as "reaching the crest," or any one of a dozen similar platitudes. The danger of falling into this pattern is that you imply a sharp downturn following the so-called crest.

It's true that there has been a downturn in auto production and new home starts. But important as they are, they tell a misleading story. The consumer still has money, intends to spend it. He hasn't run for cover any more than most business has.

Take a look at the automotive picture, which is pointed to more than anything else by the viewers-with-alarm. The fact is that despite cutback production, dealers sold more cars in November, December and January than they did in the corresponding periods a year earlier.

Retail sales continue to hold up for most commodities. Dun & Bradstreet reports that dollar volume of retail trade is "moderately above" the level of a year ago.

Early in February, there was a noticeable increase in sales of household goods and men's apparel, both good signs of consumer spending. There has even been a slight increase in sales volume of new cars, automobile parts and supplies.

Television sets and radio sales increased, although the sales of major appliances fell off somewhat. Evidence of consumer confidence is seen in increased sales of men's suits, coats, sportswear, hats and ties as well as more buying of women's suits and coats and children's clothing.

Something else to think about is the high level of employment that has been attained and the corresponding low level of unemployment.

During 1955, the number of major areas of substantial unemployment was decreased from 48 to only 19 and the number of smaller centers from over 100 to 64. This means that there are only a few areas in the country where unemployment is a problem of any size.

Why Inventory Is No Problem

Another subject of some concern is inventory. Perhaps you are worried over the possibility of manufacturer and retail inventories getting too large. Commerce Dept. figures do show year's end inventories at $80 billion. That's about $5 billion over the level of a year ago.

Taken at face value, that's a big gain. But you should realize that about two-fifths of the rise in value is a reflection of higher replacement costs. Manufacturers' stocks increased $200 million from the end of November, retailers' jumped $300 million.

Something to think about when considering inventory size is that business sales are up about 10 pct in that period. Same is true of gross national product. Weighed against these, and the probability of higher prices for most products in the foreseeable future, inventories aren't unusually large at all.

What $1 an Hour Means to Business

Whether or not you approve of the new $1 an hour minimum wage law (going into effect March 1), you should know what its broad impact will be on the economy.

It is estimated the new minimum will have the effect of increasing pay of 9 pct of all workers subject to the act. The U. S. Labor Dept. says about 2 million workers will get immediate raises, adding $560 million to the annual wage bill (and putting that much more spending power into the economy).

INDUSTRIAL BRIEFS

Bright Light . . . Duro-Test Corp., N. Bergen, N. J., has introduced a new light source combining desirable features of modern incandescent, fluorescent and mercury vapor lamps. It has been named the fluomeric lamp. It emits light in three ways, by gaseous discharge, fluorescing of activated phosphor powders and by tungsten filament.

Conditioned To Act . . . A new trade group, the Air Moving and Conditioning Assn., Inc., has been formed in Chicago, by forty-six manufacturers of air moving and conditioning devices. The group will collect and disseminate information of value to the membership, the industry, and the public regarding products and their application.

Down To Earth . . . 1500-horsepower Allison aircraft engine used to power World War II fighter planes is now utilized in oil well fracturing and acidizing equipment by Dowell Inc. One thousand lb of magnesium replaces 4000 lb of cast iron.

Stock Exchange . . . The Beryllium Corp. has acquired all capital stock of National Precision Casting Corp., Clifton Heights, Pa. Present management and manufacturing operations will continue to operate without any basic change.

Century . . . Robinson Clay Product Co., Akron, O., a leading refractories manaufacturer, is observing its 100th anniversary in 1956. A special promotional program will highlight the observance. It will include salutes from U. S. Chamber of Commerce, the Ohio Chamber of Commerce, and the National Assn. of Manufacturers and other prominent local, state, and national organizations.

Split Fasteners . . . Shakeproof Div., Illinois Tool Works, manufacturers of fastening devices, has been re-organized into two divisions, with separate engineering staffs, special field representatives and separate manufacturing facilities. New Fastex Div. will have engineering facilities available to manufacturers of various types of components, sub-assemblies and finished products, to help achieve economies of size, material or assembly time.

Motor City Rep. . . . Alloy Steels, Inc., Detroit, will represent Firth Sterling Inc., Pittsburgh, producers of high speed steels.

Metal Stamps . . . Reece Geissinger Associates of Pittsburgh has been appointed metal stamping sales representative for western Pa., W. Va., Ky., and Tenn. by the Worcester Pressed Steel Co.

"Ten whole years since I got out of the Army! Why, it seems like yesterday I was running up and down those mountains with a full field pack."

Problem Solving Course . . . Series of training programs on industrial programming, sales analysis and allied fields will be given by Executive Services, management consultants of Cleveland, which will encompass problems encountered in every type of business, large or small.

More Empire State . . . The Seneca Falls Machine Co., Seneca Falls, N. Y., manufacturers of lathes and special automation equipment, has added the Buffalo, Rochester and Syracuse areas to the territory covered by Rudel Machinery Co.

No Windmills . . . A National Aviation Museum will be opened at Schiphol Airport in the Netherlands in 1957. The museum will house a unique collection of aircraft, engines, historic documents and photographs of Dutch pioneers who have contributed to the development of aviation.

German Tools . . . Kurt Orban Co., Inc., importers of German machine tools, has appointed Superior Sales and Engineering Co., Orange, N. J., its northern New Jersey sales representative.

TV High . . . Production of television receivers established a new record in 1955, according to the Radio-Electronics-Television Manufacturers Assn. During the past year, 7,756,521 TV receivers were manufactured compared with 7,346,715 turned out in 1954 and 7,463,800 in 1950, the previous record year.

Reducer Deal . . . Morse Chain Co., a Borg-Warner Corp. subsidiary, has acquired Eberhart-Denver Co., Denver, Colo., and its affiliate, the Spreco Co., Chicago. Eberhart-Denver Co. is a leading manufacturer of speed reducers.

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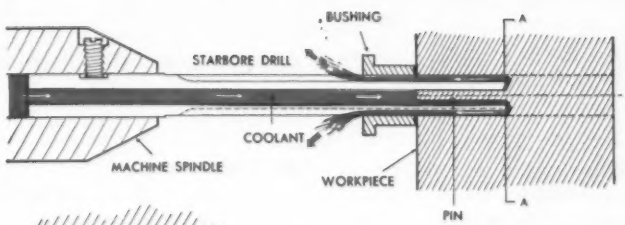
*U. S. Patent No. 2,674,908



Coolant directed under pressure to the cutting edges through the off-center hole flushes out chips through flutes along the shank.

For complete details write for Starbore Engineering Data Folder SC-27

See Starbore in Action at the ASTE Industrial Exposition International Amphitheatre Chicago, March 19-23, 1956

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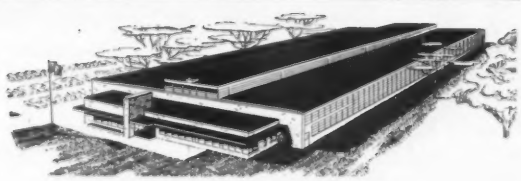


AUTOMOTIVE ASSEMBLY LINE

Will Two-Car Family Settle For Less?

Detroit ponders second-car trend . . . American bets Rambler that public will want smaller car . . . Big companies have no plans to build small unit . . . Higher gasoline cost a factor—*By T. L. Carry.*

◆ DISCUSSIONS on the place of the small car in this country have led to the question of whether there is a definite market for smaller autos here.

Producers that have been getting rich on standard size automobiles insist that there is no change in the American public's desire to own a big car.

Can Mean Survival . . . On the other hand, companies whose survival depends on marketing a smaller package insist that there is a definite market and that it is growing every day.

Take American Motors, for example. The company's whole merchandising philosophy is built upon its Rambler. This is the car that AMC hopes will retain a respected place in the auto industry. It behooves the company to insist on a definite, growing small car market.

General Motors Corp. has made its mark by becoming the leading producer of standard size cars. So the corporation says that the public is not yet ready for a small car and GM has no plans to build one.

Both companies have arguments in their favor.

AMC, through its president, George Romney, says that the trend to two-car families is increasing the need for a smaller auto. The increase in suburban living and higher incomes are other factors which Mr. Romney cites to prove his point.

Rambler Sales Up . . . Sales figures at American Motors tend to verify Mr. Romney's statements. Rambler sales in 1955 were double what they were in 1954 despite the fact that the 1955 Rambler was introduced much later than other cars. So far this year, sales in January are running 30 pct ahead of what they were in the same month last year.

Harlow Curtice, president of GM, takes the opposite stand. Studies conducted by GM, Mr. Curtice says, show that as you reduce the size of a car, you take out the value much faster than you take out the cost. In other words, a used large car is worth more than a new, small car.

Chances are that at the present time both companies are right. But both can't be right for very long.

Suburban Living . . . The suburban family, where the man drives 20 miles to work every day and leaves his wife stranded with 3 or 4 children in the country, needs a second car.

Chances are that most suburbanites are not particularly interested in the value of a second car as long as it serves the purpose of transportation. The family's aim is going to be the best transportation at the least cost and smaller cars are cheaper whether they are new or used.

Another factor that must be considered is the highway improvement program which is likely

Austin Works on Own Gas Turbine

◆ JUST LIKE in the U. S., British automakers are making progress on the gas turbine toward eventual use in passenger cars.

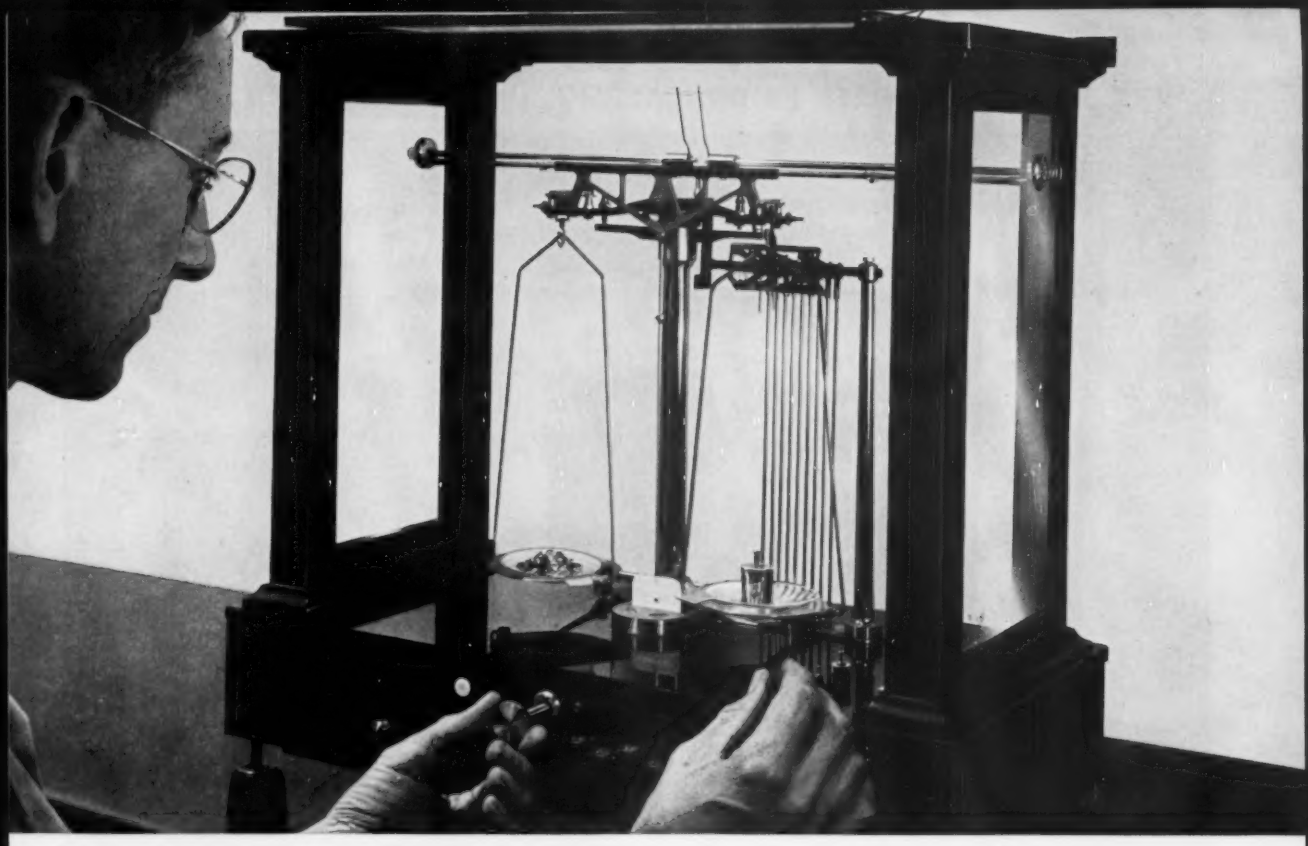
The Austin Motor Co. reports that it has developed a heat exchanger that may result in fuel economy comparable to that of diesel engines. The Austin unit is designed to run on fuel oil in preference to kerosene because of its ready availability at filling stations and also because of British fuel tax requirements.

Austin experiments with a small gas turbine engine began in 1949. By 1951, enough progress had been made to test components. First tests resulted in buckling of nozzles and undesirable expansion of blades. A complete engine was tested in 1952 and in 1954 a complete power unit was mounted in a car. Only alterations necessary in the car body were to bring forward the radiator grill and to provide louvres for heat exhaust.

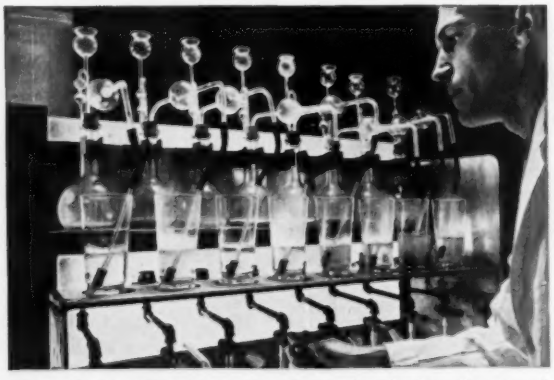
The first engine was damaged because of an ignition failure and a modified unit was built in 1953. Blades in the second unit were cast by the lost wax method, instead of machining individual blades.

Dr. J. H. Weaving, head of Austin's gas turbine research, says that among the problems yet to be solved are production of an inexpensive heat exchanger of light construction, improvements in compressor and turbine.

Heat exchangers are also used in experimental units designed by U. S. automakers.



How Great Lakes Steel *weighs* quality



IN A QUALITY CONTROL LABORATORY, chemical analyses such as these, are run on every heat. Then . . .

THE ANALYSES are telautographed immediately to the melter so he can add elements to meet customer's requirements.

How much does quality weigh? In the photograph above, a test sample is being weighed for chemical determinations. Tests like this give our open-hearth operators a running check on molten steel while it is still in the furnace; enable them to pour heat after heat of high and uniform quality.

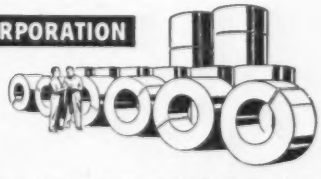
In every department at Great Lakes Steel, from raw material docks to delivery of finished steel, the emphasis is on quality—on seeing that customers receive steel that meets their particular requirements.

Do you have a manufacturing problem involving flat-rolled steel? A call to Great Lakes will make available to you the experience of our entire organization.

GREAT LAKES STEEL CORPORATION

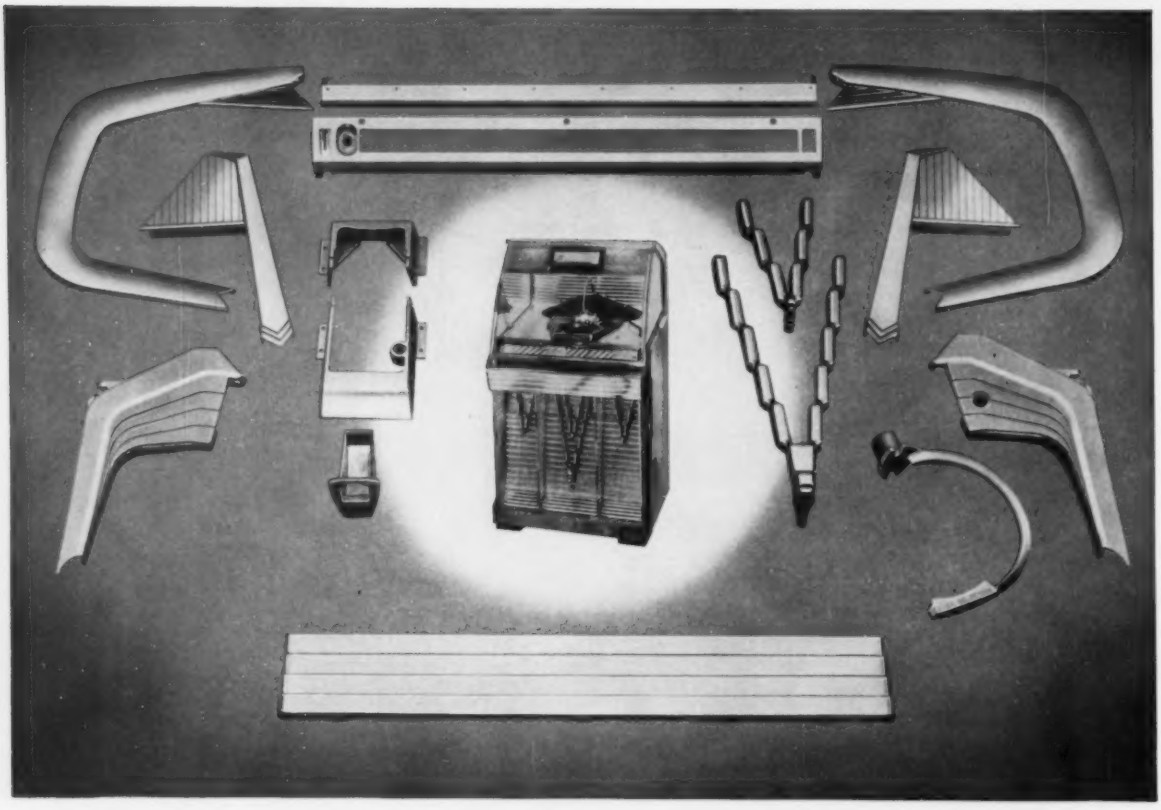
Ecorse, Detroit 29, Michigan • A Unit of

NATIONAL STEEL CORPORATION



District Sales Offices: Boston, Chicago, Cincinnati, Cleveland, Grand Rapids, Houston, Indianapolis, Lansing, Los Angeles, New York City, Philadelphia, Pittsburgh, Rochester, St. Louis, San Francisco, Toledo, Toronto.

WHY ZINC RATES FIRST IN DIE CASTING • NUMBER 7 OF A SERIES



ease of assembly for ROCK-OLA

Much of the cost and many of the headaches involved in turning out a product like a coin operated phonograph are centered on the assembly line. Rock-Ola engineers, like those in many other fields of product engineering, minimize their assembly problems through the well-planned use of ZINC Die Castings.

The castings shown here comprise most of the exterior trim on the latest Rock-Ola Hi-Fidelity music maker. Because the unusual shapes can be die cast, the eye-catching decorative effects—highly important to the success of this product—are achieved with an absolute minimum number of components.

Since all ZINC Die Castings in a long production run are identical in size (with precisely located fastening elements) assembly is rapid and trouble-free. Furthermore, the smooth, as-cast surfaces of ZINC Die Castings require no special preparation prior to the application of beautiful, durable chromium plate by standard finishing procedures.

Send for your copy

Other important reasons for the ever-growing popularity of ZINC Die Castings will be covered in this space in the months ahead. Send for a copy of our brochure and contact any commercial die caster for the answers to your particular production problems.

ZINC
FOR DIE CASTING ALLOYS

The New Jersey Zinc Company, 160 Front Street, New York 38, N. Y.

The Research was done, the Alloys were developed, and most Die Castings are based on

HORSE HEAD SPECIAL (99.99 + % Uniform Quality) ZINC

Automotive Production

(U. S. and Canada Combined)

WEEK ENDING	CARS	TRUCKS
Feb. 11, 1956	142,833	25,945
Feb. 4, 1956	146,641	27,828
Feb. 12, 1955	175,353	15,783
Feb. 5, 1955	170,846	19,294

*Estimated. Source: *Ward's Reports*

to be passed in Washington this year.

Financing the new roads is going to increase the federal tax on gasoline one cent.

The increase in cost is not going to go unnoticed by the driving public and motorists may look for ways to cut down expenses.

Look Ahead . . . Here, again, the smaller car comes into the picture. The value may not be as much, but neither is the gasoline consumption.

But sales have not reached the point yet where they would justify a larger company considering production of a small car. However, the time may be coming.

Non-slip Differential

Studebaker Div. of Studebaker-Packard Corp. is introducing a non-slip differential on its half-ton trucks.

The differential, also introduced on this year's Packards, will be available on the vehicles next March.

It is the first time in the industry that the device has been used for trucks. Chief advantages of the new differential are safer operation and economy. The elimination of wheel spinning saves wear on tires.

The new differential divides the engine's driving power in such a way that the most power goes to the rear wheel with the most traction. In ordinary differentials, power is always transmitted to the wheel with the least traction.

Thus, if a truck gets stuck on ice or snow with one wheel spinning, all the torque from the engine will be applied to the wheel on the driest surface.

Differentials based on distributing power unequally have been on the market for trucks since the 1930's. But this is the first time that a unit has been introduced that can be installed on a mass production basis at a relatively low cost.

The Studebaker non-slip differential is available at this time only on the division's half-ton units and is optional at extra cost.

Organization:

Chrysler creates engine and transmission group.

If imitation is the sincerest form of flattery, General Motors Corp. should be well pleased with a recent announcement from the Chrysler Corp.

Chrysler has just established a new, three-division manufacturing group involving 15 manufacturing plants, 10 in the Detroit area and five in Indiana.

The new unit, designated the Engine and Transmission Group, will be responsible for production of axles, transmissions, engines and other component parts that are assembled largely from machined forgings and castings.

Included in the new group are the Forge and Foundry Div., Axle and Transmission Div. and Engine Div.

Should Cut Costs

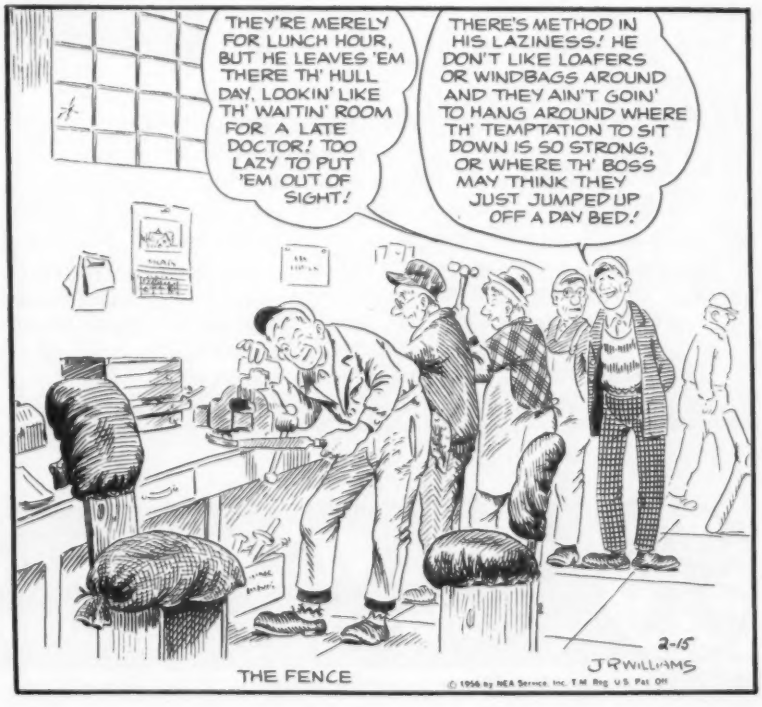
L. L. Colbert, Chrysler president, says formation of the group is a further step in the corporation's continuing program of decentralization. The object is to cut costs and increase quality, efficiency and profits.

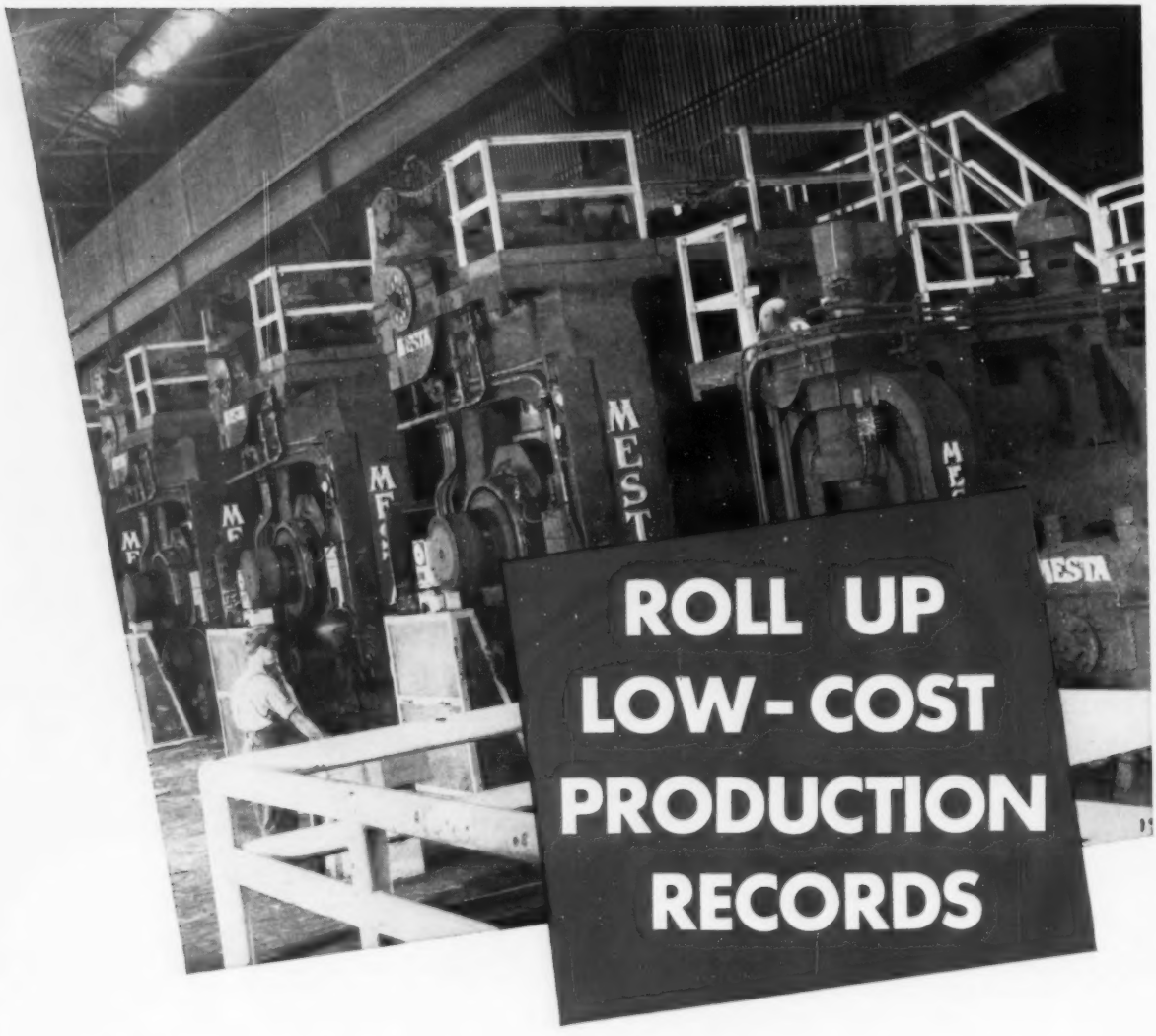
Most of the plants involved in the new group were previously operated by individual car divisions within Chrysler. Eventually, it is hoped that the new group will supply the majority of cast and forged parts used in Chrysler's cars.

The decentralization program at Chrysler has been going on now for at least 2 years.

General Motors Corp. has been the pace-setter in the industry as far as decentralization is concerned. Both Chrysler and Ford have seen the wisdom of decentralizing in the same manner.

THE BULL OF THE WOODS — **By J. R. Williams**


THEY'RE MERELY FOR LUNCH HOUR, BUT HE LEAVES 'EM THERE TH' HULL DAY, LOOKIN' LIKE TH' WAITIN' ROOM FOR A LATE DOCTOR! TOO LAZY TO PUT 'EM OUT OF SIGHT!
THERE'S METHOD IN HIS LAZINESS! HE DON'T LIKE LOAFERS OR WINDBAGS AROUND AND THEY AIN'T GOIN' TO HANG AROUND WHERE TH' TEMPTATION TO SIT DOWN IS SO STRONG, OR WHERE TH' BOSS MAY THINK THEY JUST JUMPED UP OFF A DAY BED!
2-15
J R WILLIAMS
THE FENCE
© 1956 by NEA Service, Inc. T.M. Reg. U.S. Pat. Off.



WITH *Texaco Regal Oil* in roll stand circulating systems, production goes up because performance is dependable and efficient at all times. This turbine-grade oil reduces maintenance costs too, by giving oil film bearings maximum protection and keeping oil lines clean for constant lubrication.

Texaco Regal Oil has exceptional resistance to oxidation and emulsification, thus assuring sludge-free systems. Its protective lubricating film prolongs bearing life and assures normal temperatures—even under the heaviest loads.

To keep enclosed reduction gears running smoothly and more efficiently at low upkeep cost, use *Texaco Meropa Lubricant*. It retains its stability under extreme pressures . . . resists oxidation, thickening and foaming . . . greatly extends gear life.

You can get peak performance and hold costs down at every step of your operation by employing effective lubrication. Any Texaco Lubrication Engineer has all the information you'll need. Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write:

The Texas Company, 135 East 42nd Street, New York 17, New York.

TEXACO

TEXACO Lubricants, Fuels and Lubrication Engineering Service

TUNE IN: TEXACO STAR THEATER starring JIMMY DURANTE on TV Sat. nights. METROPOLITAN OPERA radio broadcasts Sat. afternoons.

Missile Talk Behind Capitol Doors

Defense Dept. has definite dope on Red missile strides . . . Private talks with Congress clear the way for U. S. push . . . Army, Navy and Air Force get go-ahead on crash programs—By G. H. Baker.

◆ ONE GOVERNMENT procurement program that won't be cut back this year is the guided missiles program.

All three military services—Army, Navy, and Air Force—are being encouraged by congressional committees to push development of missiles with all the money and manpower that's available.

The Pentagon recently learned—and told Congress privately—about some "vast improvements" made recently in Communist guided missiles. As a result, Congress told the military leaders to shoot the works in bringing the U. S. missile program up to par.

The Pentagon anticipates Congress will approve all or most of the $1 billion increase in defense spending as requested by Defense Secretary Wilson and as endorsed by President Eisenhower. The lion's share of this extra $1 billion will be set aside for missiles, supersonic planes, and other new types of weapons.

Recruiting Lags . . . Sagging recruitment totals worry defense bosses. Too many young men are pulling strings to "beat the rap" when faced with a period of duty with the armed forces.

Draft Director Lewis B. Hershey says the present downward trend in enlistments is going to produce plenty of trouble in the nation's $35 billion defense program if something isn't done to end it, and to instill a little patriotism into young men.

What's Wrong . . . Youths today say frankly they don't want to give up innerspring mattresses and the comforts of home for a hitch in the Army, Navy, or Air Force. Many of them tell their draft boards they are too "important" in their civilian jobs, and cannot be "bothered" with military duty.

Says Hershey:

"We've got to inoculate education in our youth that this country is worth fighting for." This job is up to the families, the schools, and the churches, he observes.

Would Curb Unions . . . A move by two Republican senators to bar unions from politicking is under slashing attack from the AFL-CIO. The union says Senators Curtis, R., Neb., and Goldwater, R., Ariz., are trying to "destroy the rights" of workers.

The Taft-Hartley labor law prohibits corporations and unions from contributing directly to political causes. But the AFL-CIO gets around this prohibition by funneling all its political activities and its political funds through a subsidiary organization, the "Committee on Political Education" (COPE). Corporations have been slow to figure out a similar loophole.

What They Want . . . The Curtis-Goldwater plan would outlaw "captive" committees like COPE by placing a direct ban on campaign contributions by unions or union officials. As matters stand now, the 15 million members of AFL-CIO unions are urged to "give a buck" apiece to the COPE war-chest.

With rare exceptions, all candidates receiving AFL-CIO financial support are Democrats. As a result, the Democrat-controlled Senate has no intention of permitting the Curtis-Goldwater move to gain any headway.

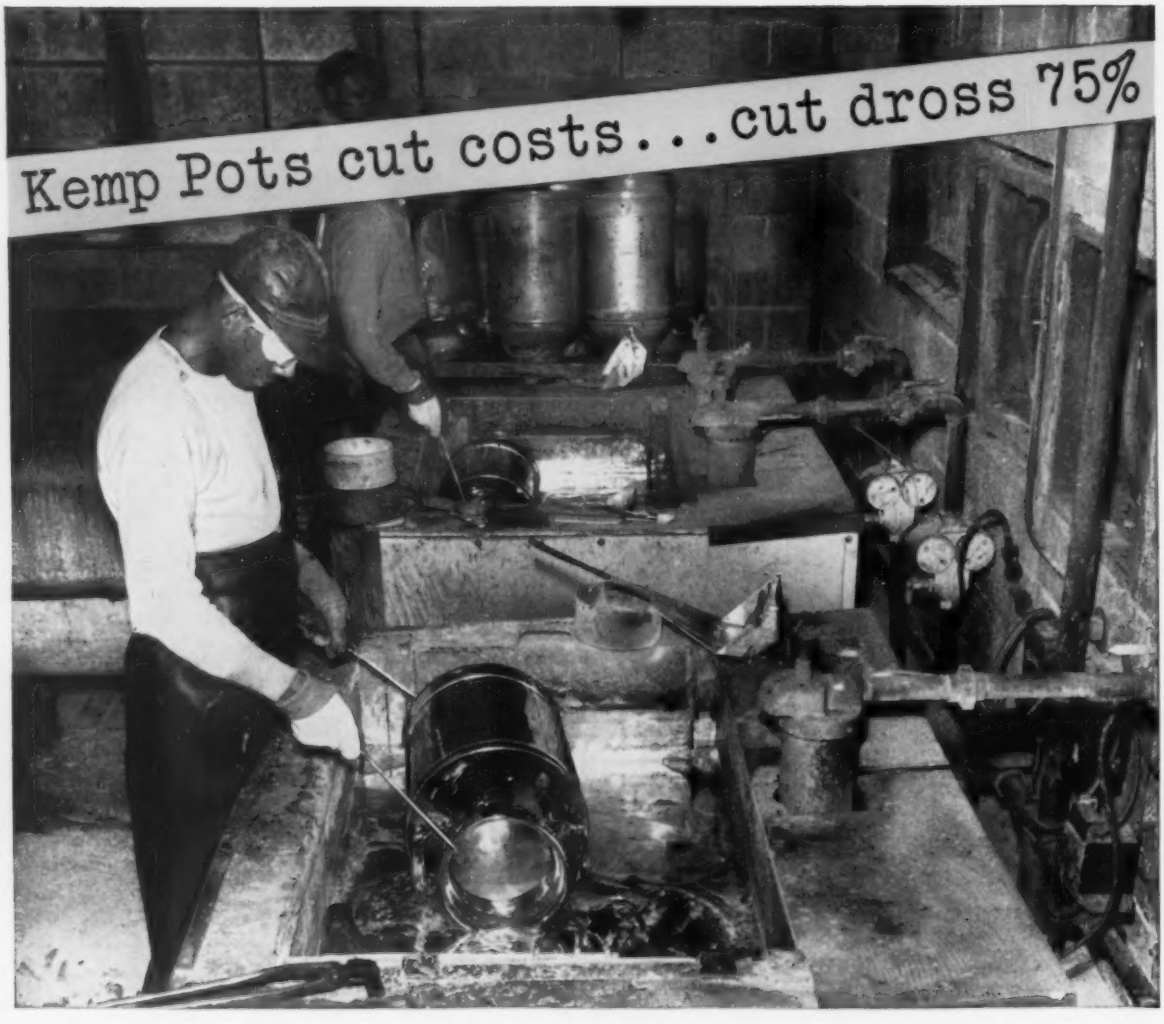
Plan Reactor Plant

Pioneer Service and Engineering Co., Chicago, will work with an Atomic Energy Commission laboratory in designing and developing a prototype nuclear reactor plant to be used by military units in remote areas for electricity and space heating.

A low-power reactor that will have a combined electrical and

Defense Spending Shows Swing to Missiles

	Expenditures		
	1955	1956	1957 (est.)
Guided Missiles	$569 million	$917 million	$ 1.2 billion
Aircraft	$ 8.0 billion	$ 6.8 billion	$ 6.7 billion
Ships	$ 1.0 billion	$955 million	$ 1.0 billion
Ammunition	$818 million	$ 1.0 billion	$827 million



Springfield Can Co. reports: *Improved retinning quality at lower cost with Kemp Melting Pots*

Retinning dairy equipment is the main plant operation at the Springfield (Missouri) Can Co. Milk cans are treated in a retinning room where 2 Kemp Immersion Heating Pots melt block tin and keep it in liquid form for the operation.

Installed in January, 1955, the Kemp Pots have already proved superior to the old, externally heated pots in quality control. They have reduced dross formation 75%. The constant, even heat of Kemp Pots helps produce heavier tin coatings, which give the retinned cans the quality appearance and life of new cans.

Kemp Saves Fuel, Production Time

The Kemp units heat much faster than old-fashioned methods and maintain an even temperature. This means lower fuel costs as well as valuable production time saved. Mr. Jack Simon, Springfield Can Co. owner, sums it up by saying, "The Kemp Melting Pot is the finest produced!"

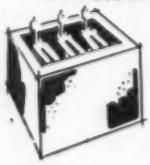
Kemp Can Help You

You benefit in many ways when you install Kemp Melting Pots: they are not subject to periodic and expensive breakdowns . . . offer greater heating surface, faster heat recovery, lower dross formation, even lower room temperatures—they operate continuously at maximum efficiency with a substantial saving in fuel costs.

Find out how Kemp engineers can provide the most profitable solution to your heating or melting problem. Write for Bulletin IE-10 today.

KEMP OF BALTIMORE

IMMERSION MELTING POTS



CARBURETORS • BURNERS • FIRECHECKS • ATMOSPHERE & INERT GAS GENERATORS • ADSORPTIVE DRYERS
SINGEING EQUIPMENT

THE C. M. KEMP MFG. CO.
405 East Oliver Street, Baltimore 2, Maryland

heat energy output of several hundred kw is planned by the Argonne National Laboratory, Lemont, Ill., and the Chicago firm. It is intended to be simple, easily transported and put up.

The Argonne Low-Power Reactor (ALPR) will consist of a pressure vessel containing enriched uranium fuel elements and a number of neutron-absorbing control rods submerged in water. Water will circulate through the reactor core by natural convection. Steam produced by heat created by uranium atom fission will be conducted directly to a turbine-generator.

Tax Toolhaulers

Industry employees who drive to work must consider the use of their automobiles a nondeductible personal expense, even if they haul their work tools in their cars, the Internal Revenue Service holds.

In a new ruling, the IRS says the expense of going to and from work is not made greater by the transportation of the employee's tools in his car.

As determined by the agency, the full amount of the expense is a commuting expense, and no part of it may be allocated for tax purposes to the hauling of tools.

Revise Record Rules

Revisions of the U. S. Commerce Department's BDSA Regulation 3, covering defense materials allocations, require firms involved to retain their records for three years.

The revised regulation also establishes a procedure for filing requests for adjustments or exceptions to allocation orders and provides that false information or concealment of a material fact in a report under the regulation is a violation.

Provisions of the regulation pertaining to assistance in obtaining materials to fill military or atomic energy rated orders are retained.

Approve Atomic Ship

Even the staid, reserved contingent in Congress is apparently getting atomic-minded. The House has authorized by an overwhelming 358-3 vote construction of an $88.6 million atomic-powered cruiser for the Navy.

Cruiser, which will be equipped with guided missiles, is part of a $1.4 billion Navy ship construction program authorized by the same vote. Six more atomic submarines and a start on an atomic-powered supercarrier are also included in the program. Eight guided missile destroyers, four guided missile frigates, and a sixth conventionally-powered aircraft carrier of the Forrestal class are also authorized.

Meanwhile, the Navy is going ahead with plans for a fifth nuclear powered submarine.

Jobs:

U. S. figures show shortage of skilled workers.

Employment picture in 1956 will be bright. Most workers who really want a job will have one, make good wages, and be ready to buy. Many businessmen will have trouble finding workers.

The shift from the employer's labor market of 1954 to employee's market is going to continue. Labor peace will come dear.

Projecting U. S. Labor Dept. trends plotted for 1955, employment this year should continue to edge up past the 65 million mark, while unemployment remains between 1.5 and 2.5 million. Wages will continue to rise.

What We Need

The skilled worker shortage which began to create a real pinch in May, 1955, will continue. United States Employment Service reports that from a steady demand of about 4500 skilled men in early 1955, unfilled jobs for skilled workers have risen to 7700.

Demand on government agencies to help fill openings are greatest for toolmakers and die sinkers and setters. Scarcities continue in machinists, machine shop, and related occupations; mechanics and repairmen; electronic technicians, maintenance men and mechanics; instrument men and repairmen; and skilled machine tool operators.

See Tighter Pinch

Jobs for toolmakers, airplane mechanics and repairmen, sheet metal workers, welders, electricians, pattern makers and other skilled aircraft workers also outnumber workers.

With use of automation and other automatic processes expanding, and industrial activity remaining high, the shortages of these workers will continue and in some cases tighten during the year.

Similarly, the shortage of engineers and draftsmen, particularly those with aeronautical or electronics specialties, will continue.

Employment shortages of workers ranging from highly-skilled engineers and technicians including semi-skilled talent to just good laborers will reach across the country, the Labor Dept. indicates.

Manpower Supply Shrinks

Unfilled Job Openings

	Dec. 1955	Nov. 1955	Dec. 1954	Pct Change, Dec. 1955 From: Nov. '55	Dec. '54
TOTAL	26,225	24,862	13,565	5.6	93.5
Professional and Managerial	10,409	9,899	6,191	5.2	68.1
Clerical and Sales	3,277	3,181	1,872	3.0	75.1
Service	1,504	1,178	491	27.7	206.3
Skilled	7,651	7,404	3,792	3.3	101.8
Semiskilled	2,715	2,006	461	35.3	488.9
Unskilled	699	1,194	758	−41.5	−7.8

MONEY-SAVING MAGIC IN THIS "HEEL AND TOE"

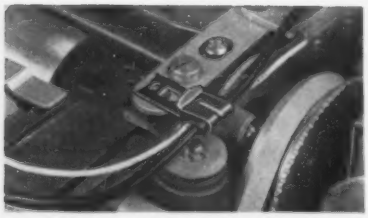
This Tinnerman fastener is modeled after your foot . . . there's a heel and toe . . . it slides easily into the holes punched in the metal, fiber, or plastic, even as your foot slides into a shoe. But it is much easier to put on than to take off!

The primary function of this SPEED NUT fastening principle is to provide a fast, easy-to-apply, low-cost, self-retaining fastener. Its snap-on attachment feature requires little skill and no welding or staking. Yet it assures positive retention for center panel or blind locations.

Tinnerman "heel-and-toe" fasteners can also have a wide variety of fastening features. The self-retaining heel-and-toe can be combined with the famous Tinnerman SPEED NUT impression. Or with a speedy cable clip . . . or a spring catch . . . a molding clip . . . a wire retainer . . . almost any fastening idea you require.

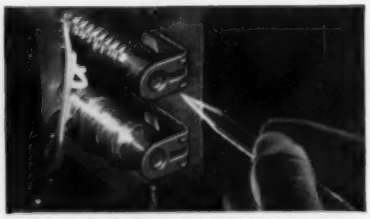
Tinnerman sales engineers are ready to make a SPEED NUT Analysis of your fastening requirements. Or you can write to us for details and engineering data. *Tinnerman Products, Inc., Box 6688, Dept. 12, Cleveland 1, Ohio.*

TINNERMAN
Speed Nuts
FASTEST THING IN FASTENINGS®

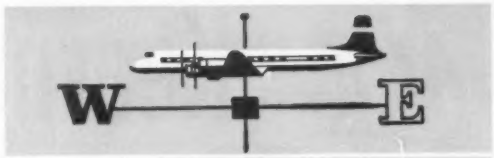


On dictating equipment, this SPEED CLIP® holds wires safely away from moving parts.

SPEED CLIPS secure molding on plastic sign, help manufacturer gain 48% assembly saving.



Assembly of TV tuning coil to chassis and servicing simplified with special SPEED CLIP.



WEST COAST REPORT

Aircraft Components Get Tough Tests

Modern aircraft components are put through tough testing pace . . . Arizona laboratory runs shake-down trials from stem to stern . . . Possible merger seen for Mine Workers and Teamsters—By *R. R. Kay.*

◆ WARNING! If you can't test it, don't build it. If you do, you're liable to fall on your face.

If you're making accessories for today's or tomorrow's aircraft, or expect to, your product had better be plenty rugged. Current tests are really punishing.

That goes for makers of: gas turbine motors, air turbines, starters, pneumatic power systems, cabin pressure regulators, heat transfer equipment, air valves, refrigeration turbines, electronics and radar equipment. And, incidentally, half the dollar value of today's aircraft is in accessories.

Bird's Eye View . . . This reporter tramped through the new 90,000-sq-ft production test facility of AiResearch Manufacturing Co. of Arizona, division of Garrett Corp. AiResearch makes hundreds of aircraft accessories. At its $5 million Phoenix laboratory, temperature tests run from —80° F to 1000° F; altitude tests range from 1000 ft below sea level to 75,000 ft above; air pressures go to 300 psi; and vacuum pumps work with a force 4500 times more powerful than your wife's vacuum cleaner.

There are also tough tests for vibration and for resistance to salt spray and fungus. The company puts every product it makes through the wringer, simulating the most rigorous conditions the product might undergo.

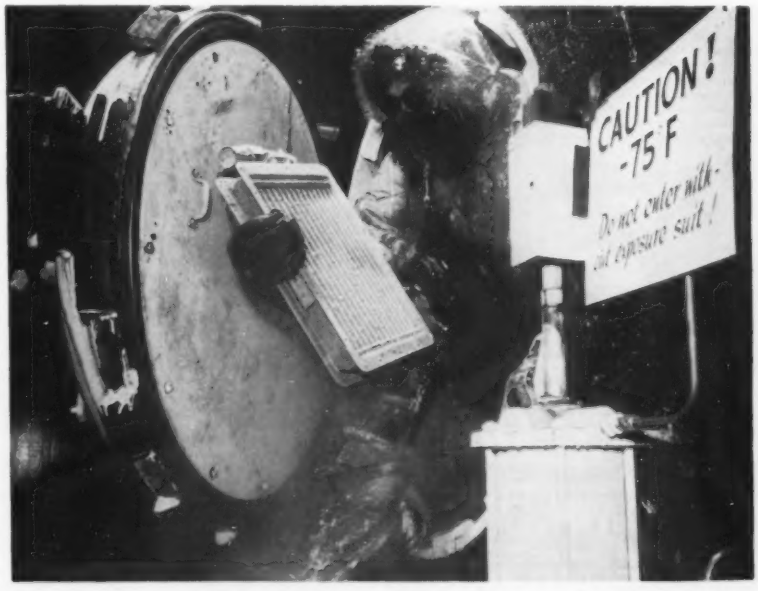
Know-how and development work in aircraft accessories manufacture are feeding products into other industries. Examples: (1) Heat transfer equipment now in use as intercoolers for diesel engine superchargers. (2) Gas turbines for ground support equipment and vehicular products.

Possible future uses for aircraft-industry-developed gas turbines: motor generator sets for electrical power; combined electrical and pneumatic energy for oil field use and for large construction jobs. Advantages: lightweight and easy to handle.

Garrett's products are 80 pct to 90 pct for the military. In Phoenix, Pres. W. C. Whitehead said his company is burning the midnight oil to develop more components for industry. He's eyeing the earth moving, railroad, and truck fields.

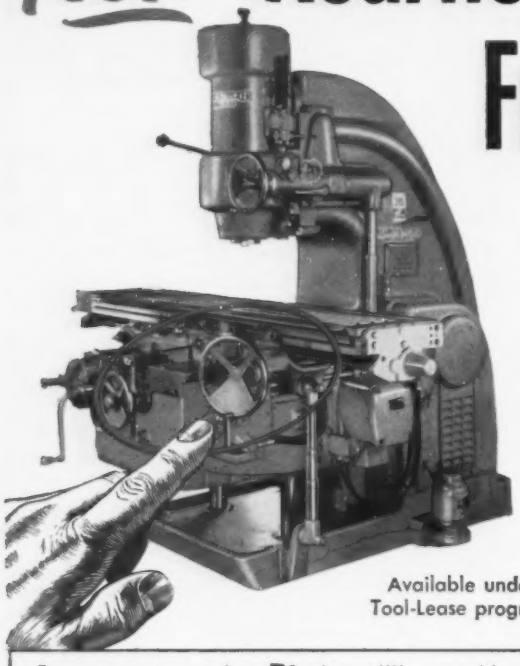
Note on Labor . . . Here's a labor note that could have widespread repercussions. Is a merger ahead for the independent Mine, Mill and Smelter Workers and Dave Beck's powerful Teamsters Union?

Nautical Note . . . Look for California to get well launched into offshore oil drilling this year. It will mean lots of demand for metalworking products by exploration companies. And, too, it will bring much needed shipyard work to outfit vessels and offshore structures. R. L. Minckler, president, General Petroleum Corp., Los Angeles, also sees dry land exploration going ahead at a fast clip.



ABILITY of an experimental heat exchanger to stand up under extreme cold is thoroughly checked by parka-and-goggles protected technician at the laboratory of the AiResearch Manufacturing Company of Arizona.

Now Kearney & Trecker has Front-Mounted *(convenience-engineered)* Handwheel



Available under Tool-Lease program

Standard equipment on new TF Series milling machines — front-mounted for faster table settings ... positioned to prevent errors

THE front-mounted table handwheel is a standard feature on all Kearney & Trecker new TF Series, knee-type milling machines — Plain, Universal and Vertical. Mounted on the right front of the saddle and projecting diagonally, the newly positioned handwheel is a part of Kearney & Trecker's up-front central control grouping.

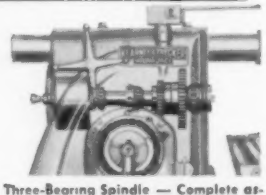
Because the handwheel is ideally located so as to simplify operation of the machine, the operator makes table settings more accurately — in less time and without leaving his normal operating position. It measurably reduces operator fatigue.

In addition, the new TF's give you a combination of more outstanding design and operating features (illustrated at left) than any other knee-type milling machine on the market today. They're available in five sizes — No. 2 to No. 6 from 10hp to 50hp.

For complete specifications, and what these TF's can do for you, see your nearest Kearney & Trecker representative, or write direct to Kearney & Trecker Corp.

5 more reasons why TF Series milling machines are so easy to operate

Heavier, Wider, One-Piece Knee — The TWIN SCREW arrangement supports the heavier, larger knee. Span and length of ways is increased considerably, providing fuller saddle support . . . lasting accuracy . . . substantial reduction of way and gib wear.



Three-Bearing Spindle — Complete assembly consists of three heavy-duty bearings, flywheel, a train of wide-faced forged steel gears. Rigidity of spindle unit contributes to increased cutter life, better finish and quieter operation.

Double "Vibra-Void" Overarms — Two solid steel bars, mounted completely through column, void vibration at source, afford more rigidity and resistance to deflection than any other type support. Design also greatly simplifies changing of arbors and cutters.

Twin Screw Knee Support — Exclusive double-support arrangement most effectively distributes weight of new machines' much wider, heavier knee, saddle and table. Balanced design increases stability under heaviest loads . . . offers greater resistance to torsional thrust under all cuts.

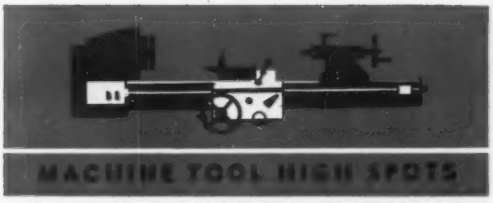
Massive Column — Solid back, double-box section column is scientifically ribbed throughout to rigidly withstand heaviest cutting forces. Full bearing column face affords maximum support for the knee. Cross-mounted motor assures maximum ventilation, easy access for routine maintenance.

KEARNEY & TRECKER
MILWAUKEE

BUILDERS OF
PRECISION AND PRODUCTION MACHINE TOOLS SINCE 1898

KEARNEY & TRECKER CORP.
6792 W. National Avenue, Milwaukee 14, Wisconsin
Please send me Catalog No. TF-50 with details on new line of TF Series Plain, Universal and Vertical milling machines.

Name.....
Title.....
Company.....
Address.....
City.....Zone.....State.....



Military Men Plan More Tool Buying

New plan calls for services to get their own funds . . . Tools will continue going into current production . . . Builders approve move but think some stockpiling is needed—*By E. J. Egan, Jr.*

◆ MILITARY bigwigs say there's nothing to fear because government machine tool procurement policy was recently switched from a "buy and store" concept to one of "buy and use."

At hearings in Washington last week, they told the Senate Select Committee on Small Business that machine tool buying would probably be stepped up.

Machine tool industry representatives testifying at the hearings said they were glad to know that the military had no intention of sabotaging the much-discussed "Vance Plan." This program would steadily increase supplies of reserve machine tools that would have a definite function in an all-out mobilization effort.

What They Planned . . . Harold S. Vance, chairman of a Production and Equipment Advisory Committee that produced the plan in 1953, also testified. He said that the original committee report urged stepped up buying and package tool programs budgeted by each service, and not the lump sum appropriation that has been given to the Defense Dept.

Mr. Vance's statement was backed up by Arthur S. Flemming, director of the Office of Defense Mobilization. He thinks the "buy and use" program will do a more complete job if each service branch has a chance to ask for all the funds it needs each year, rather than be forced to take its portion of the annual DOD "pie."

See Close Check . . . The Defense Department, Mr. Flemming said, will get an opportunity to review the tool buying and modernization programs of each service, and congressional appropriations committees will also get a crack at the fund requests. Under the new system, he added, the ODM will require periodic reports on machine tool inventories and buying programs to see that they're kept moving along.

"I am definitely not happy with the way the machine tool program has been running up to now," Mr. Flemming said. The previous policy was too restrictive, but "more funds should be spent under the new system," he stated.

Builder Approves . . . Swan E. Bergstrom, vice president of the Cincinnati Milling Machine Co., told the Senators and military planners: "The industry agrees whole-heartedly that a machine tool in use is much better than one in mothballs."

He said the new plan to put new equipment to current use is all right as long as it is understood that the tools are to be limited to current defense or military reserve purposes.

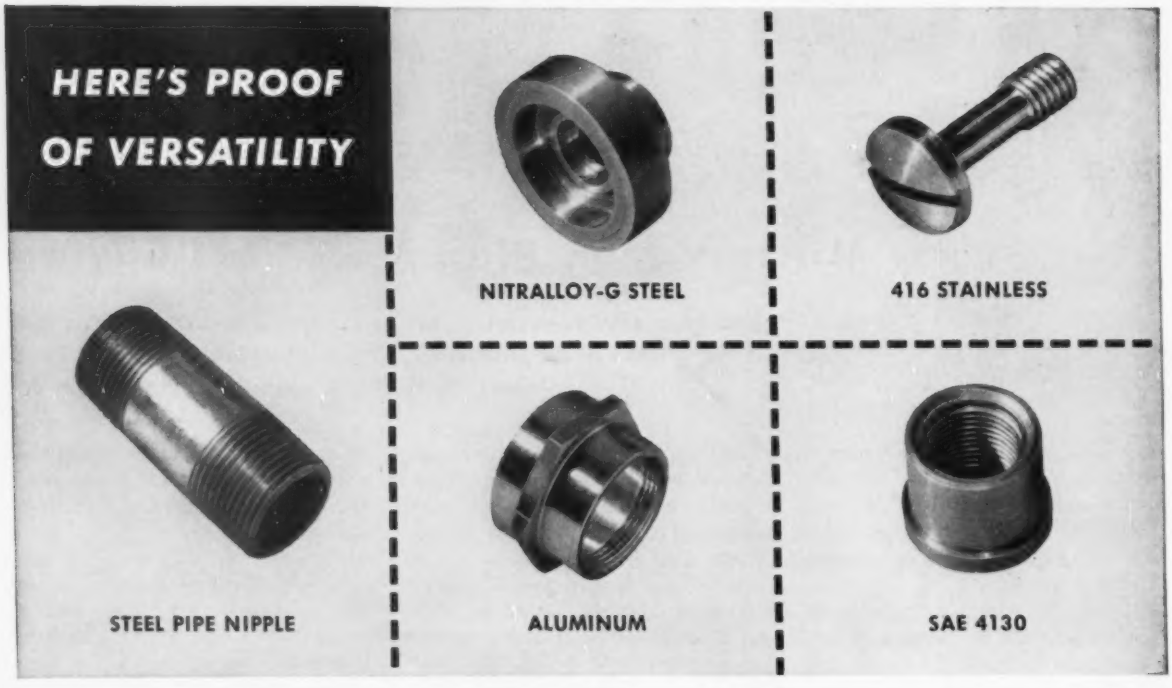
Mr. Bergstrom added the industry's hope that military emphasis on tools usable for current production "does not mean complete abandonment of the practice of buying long lead-time and other critical machines for an emergency stockpile."

Budget Draws Comment . . . Mr. Bergstrom, Sen. Sparkman, D., Ala., and James C. Kelley, general manager of the American Machine Tool Distributors' Assn., all had something to say about the budgeting program for the new machine tool procurement policy.

Sen. Sparkman is critical of the failure of the DOD to spend the $200 million it was given in the past two fiscal years. He also says that Congress has no assurance that machine tools will actually be bought under the new system if requests for funds are hidden in the services' general appropriations.

Mr. Bergstrom suggested that the annual budgeting process should be followed very closely. Mr. Kelley emphasized that machine tool modernization programs should be long-range, should motivate all government echelons, and should get priority in planning and budgeting.

"It's a bed lathe, isn't it?"



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The Iron Age SALUTES

August B. Hoefer

He got an early jump on the field and has never lost ground. Alert selling and the ability to move with new developments have made him a leader in the metal finishing industry.

In the early days of the depression, a young Purdue graduate could be seen checking the new subscriber list of a metal finishing trade publication. He would then hustle around to the companies indicated, getting to them first with his electroplating sales message.

Augie Hoefer has been getting there first for some time now. Both he and the industry have come a long way since those early scrambling days. Electroplating with cadmium; anodizing of aluminum; use of stainless steel for decorative purposes: These are just a few of the developments that have come in Mr. Hoefer's time. The electroplating and metal finishing industry has moved fast and he has stayed right with it. Today he is vice president and general manager of Frederick B. Stevens, Inc.

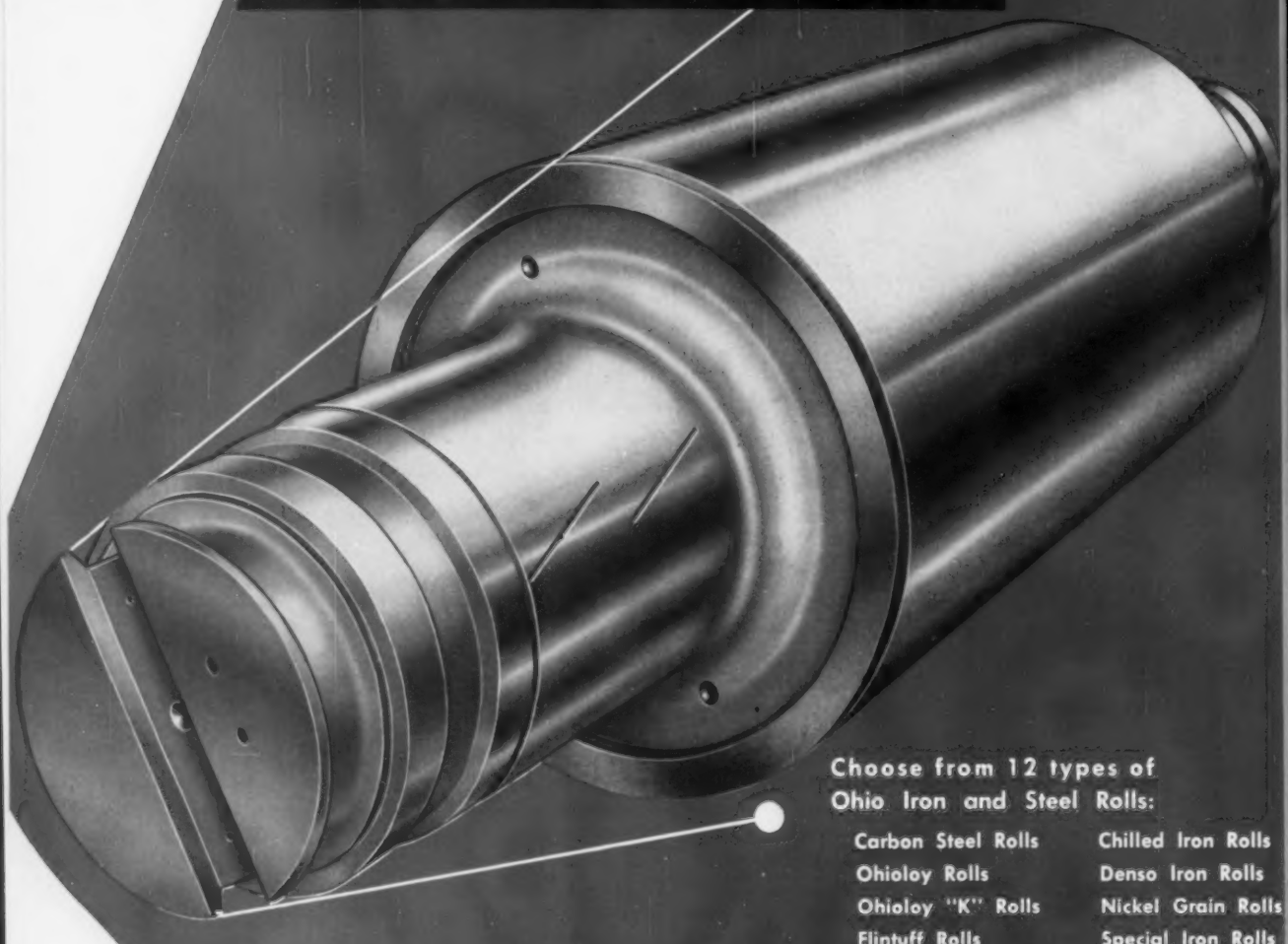
He has come a long way but he has never lost that extra step. At Stevens he is noted for his ability to keep the sales organization alert and bubbling. He is talking automation in plating and processing machines with the same fervor that marked his sales efforts in the thirties. At the same time, he has developed into a well-rounded executive. A good part of his current activities are directed at backing up the field force with a smooth-running home office.

Mr. Hoefer came out of Purdue in 1928 with a B.S. degree in chemical engineering. He went to work for General Chromium Corp. as a control chemist and service man on chromium plating solutions. From there he went to the Udylite Corp. (then Process Co.) for more plating service work. In the forties, he moved to New York as a district sales manager. In April, 1953, he was transferred and promoted to his present position with Stevens.

In his off hours, Mr. Hoefer plays golf at the Birmingham Country Club outside Detroit. He shoots a good game but is too much of a family man to go off the deep end on golf. Family consists of Mrs. Hoefer and three lovely daughters —Elinor, Margaret and Rosemary. A man who was one step ahead of the crowd 20 years ago, he retains a forward look in today's automated sales and production.

Ohio Rolls

shaping metal for all industry



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Ohio Iron and Steel Rolls:

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- Chilled Iron Rolls
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THE OHIO STEEL FOUNDRY CO.

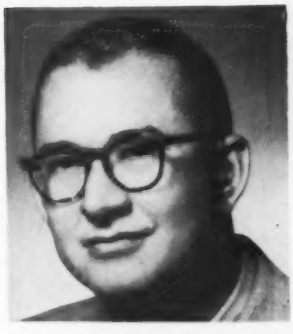
LIMA, OHIO

Plants at Lima and Springfield, Ohio

OR4

The Iron Age INTRODUCES

GORDON LAMONT, named chairman of the board, The Beryllium Corp., Reading, Pa.



ROBERT C. McDOWELL, elected president, The Wellman Engineering Co., Cleveland.

HENRY C. GOODRICH, elected vice president, The Rust Engineering Co., Pittsburgh.

MYRON B. DIGGIN, elected vice president and director, Hanson-Van Winkle-Munning Co., Matawan, N. J.

Rufus C. Barkley, Jr., named vice president, **The Cameron & Barkley Co.,** Charleston, S. C.

Albert C. Childs, appointed vice president, sales, **National Steel Corp.,** Pittsburgh.

Samuel W. Solomon, elected vice president, sales, Hanover Div., **Solar Steel Corp.,** Union, N. J.

Ralph A. Shoemaker, appointed assistant to vice president, **The Bullard Co.,** Bridgeport, Conn.; **Charles H. Parks,** appointed manager, industrial engineering; **Eugene V. Gruman,** appointed general superintendent.

David E. Weaver, appointed assistant superintendent, South Chicago, **Republic Steel Corp.,** Cleveland; **Ludrick Kukulinski,** appointed superintendent, Mechanical Dept., Youngstown District; **Alexander Carnie,** named chief division engineer, Truscon Steel Div., Youngstown, O.

Charles W. Yutmeyer, appointed superintendent, Open Hearth and Electric Furnace Melting Depts., **Crucible Steel Co. of America,** Midland Works, Midland, Pa.

T. R. Dunlevy, appointed general manager, sales, Southco Div., **South Chester Corp.,** Lester, Pa.; **H. J. Jordan,** appointed manager, fastener sales; **W. E. Stowe,** appointed manager, rivet sales.

John W. Pozerychi, appointed plant manager, **International Packings Corp.,** Bristol, New Hampshire; **John W. Reedy,** named quality manager.

John W. Breitmayer, appointed sales manager, Hallowell Collar Div., **Standard Pressed Steel Co.,** Jenkintown, Pa.

R. B. Warren, appointed sales manager, Industrial Products Div., **Goodyear Tire & Rubber Co.,** Akron, O; **O. A. Shilling,** appointed manager, Industrial Products Depts.

James F. Jones, appointed assistant manager, Automotive Products Group, **A. O. Smith Corp.,** Milwaukee; **D. W. Sherman,** appointed executive staff engineer.

David M. Roney, Jr., appointed assistant sales manager, **Hanson-Van Winkle-Munning Co.,** Matawan, N. J.

John Mordica, named field sales supervisor, drawing lubricants, Metal Processing Dept., **Pennsylvania Salt Manufacturing Co.,** Philadelphia, Pa.

Frank E. Nutt, appointed sales promotion manager, **Century Electric Co.,** St. Louis, Mo.

Jess N. McCombe, appointed district sales manager, Wisconsin Territory, **The Columbia Tool Steel Co.,** Milwaukee branch.

Whether we "NEED IT OR NOT"

Frank Sorensen, Jr.

TREASURER, THE CINCINNATI GEAR CO.

In one way we're a little like the old-timer who religiously took a bath every Saturday—whether he 'needed it or not.' We take somewhat the same attitude towards the replacement of our gear manufacturing equipment. We purchase new equipment and tools and retire old machines on a regular calendar basis, even though the old ones may seem adequate for further use. It is all too easy to slip into the habit of putting off purchase of a new unit because the old one still has "lots of use left in it," or is still "relatively" efficient. By prodding ourselves into the purchase of new equipment on a 'schedule' we have avoided this pitfall, and today we have as modern and efficient gear manufacturing facilities as any in the industry. Even our factory buildings (have you ever seen our plant?) reflect this constant striving for the better and the more efficient—for our present plant, built in 1942, replaced a plant that then was a relatively modern installation.

Just as the fellow who took the Saturday night bath was not out of step with the world 50 or 75 years ago, neither was the firm who bought their production machinery "to last." Today, however, the march of technological progress has become so fast and so relentless that we cannot afford to be content with what we have; an aggressive modernization policy is a *must*. We've built up a reputation for producing the best in custom gears, and for producing them efficiently—and we intend to keep that reputation in years to come.

THE CINCINNATI GEAR CO.

CINCINNATI 27, OHIO

"Gears—Good Gears Only"

Henry M. Heyn, appointed general manager, Toledo Industrial Div., **Surface Combustion Corp.,** Toledo, O.; **W. M. Hepburn, C. B. Phillips, E. G. de Coriolis,** appointed to president's staff; **Carroll Cone,** named chief engineer; **Donald Beggs,** appointed manager, research and development; **G. J. Langenderfer,** appointed sales manager, Heat Treat Div.

Frank L. Merwin, appointed assistant general traffic manager, **Kaiser Steel Corp.,** Oakland, Calif.

Richard D. Hartsig, appointed manager, contract sales, Air Conditioning Div., **Westinghouse Electric Corp.,** Staunton, Va.; **James W. Wilcock,** appointed general sales manager, Sturtevant Div., Hyde Park, Mass.

Fred Reiser, Jr., appointed manager, **Timken Rollenlager GMBH,** Cologne, Germany.

David W. Bonnar, appointed assistant sales manager, **Clearing Machine Corp.,** Hamilton, O.

Edwin Hodge, Jr., appointed to executive committee, **Blaw-Knox Co.,** Pittsburgh, Pa.

Ralph H. Stroth, appointed district manager, **Chase Brass & Copper Co.,** Pittsburgh office.

James Fentress, named general sales manager, **Foote Mineral Co.,** Philadelphia.

Gilbert C. Larson, appointed assistant general manager, Television-Radio Div., **Westinghouse Electric Corp.,** Metuchen, N. J.

Raymond A. Jeffers, appointed coordinator, apprentice training, **General Electric Co.,** Schenectady, N. Y.; **John A. Kelly,** named marketing administration specialist, Plainville, Conn.; **James E. Van Effen,** appointed manager, commercial service, Trumbull Components Dept., Plainville, Conn.

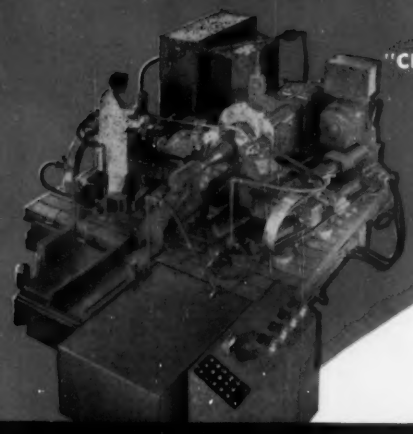
Jules F. Saut, appointed manager, sales, automotive industry, **Reynolds Metals Co.,** Detroit.

H. E. MARKLEY, elected assistant to president, The Timken Roller Bearing Co., Canton, O.

GEORGE L. DEAL, elected secretary and treasurer, The Timken Roller Bearing Co., Canton, O.

WILBERT F. HUNTLEY, appointed director, blast furnace operations, Jones & Laughlin Steel Corp., Pittsburgh.

C. D. KING, appointed assistant to executive vice president, operations, U. S. Steel Corp., Pittsburgh.



"CHIPLESS MACHINING"
Cincinnati 42" x 50"
Duplex Hydrospin

THE CINCINNATI

Hydrospin

11"

roll-flows this 11" blank . . .

86"

into this 86" seamless steel tube

JOB DATA: The blank is a billet-pierced, ring-rolled forging of annealed AISI 4140 aircraft quality steel, machined to 11" long x 13½" I.D. x ½" thick. The ring, slipped onto a straight, hardened mandrel, was *roll-formed* to the desired dimensions in less than 25 minutes (floor to floor time). "*Chipless machining*" by the Cincinnati Hydrospin reduced the wall thickness 92%. The finished tube is 86" long x 13.500" I.D. x 0.040" thick. Hardness increased to Rockwell C 39. Tensile strength after Hydrospinning is doubled. I.D. finish is 10 micro-inches and O.D. finish is 30 micro-inches or better.

HYDROSPINNING is the first economical method available for producing precision, thin-wall seamless tubing. Let a Cincinnati Milling field engineer give you detailed information. For a description of the Hydrospinning process and machine specifications, write for Bulletin M-1873-1.

CINCINNATI **Hydrospin**

PROCESS MACHINERY DIVISION
THE CINCINNATI MILLING MACHINE CO.
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Western makes dozens of component parts, of which the above are a few examples, that play a part in making today's homes more efficient *and* more attractive. Home appliance and plumbing parts must work right and look bright.

Your requirements may be for smaller or larger pieces than those shown above. Western's capacity ranges from 1/16" to 4 7/8" round, with *all* necessary finishing equipment for secondary operations such as milling, drilling, threading, tapping, heat-treating and grinding—also special finishes such as cadmium, zinc and copper plating.

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Scott Vrooman, appointed assistant manager, sales, Chicago plant, **Joseph T. Ryerson & Son, Inc.,** Chicago; **Donald E. Woodruff,** appointed manager, inside sales, Chicago plant.

Edward C. Mabbs, appointed plant manager, Wright-Manly plant, **American Chain & Cable Co., Inc.,** York, Pa.

Robert W. Dispennett, named manager, packaging foil sales, **Aluminum Co. of America,** Pittsburgh.

David G. Matthews, appointed assistant sales manager, **Wilton Tool Mfg. Co., Inc.,** Shiller Park, Ill.

Francis J. O'Brien, named works manager, Ambridge plant, **National Electric Products Corp.,** Pittsburgh.

Warren R. Spofford, appointed abrasive engineer, Syracuse area, **Norton Co.,** Worcester, Mass. Other appointments are: **Gordon S. Brandes,** abrasive engineer, Boston area; **William E. Oliver,** abrasive engineer, Grand Rapids area; **Edwin A. Danielson,** abrasive engineer, Rocky Mountain area.

Hal D. Roach, appointed sales representative, Chicago, Lacledе-Christy Co. Div., **H. K. Porter Co., Inc.,** St. Louis, Mo.

James B. Fisher, appointed district manager, sales, Detroit, **Superior Steel Corp.,** Carnegie, Pa.; **Lee D. Walters,** appointed assistant vice president, and special automotive representative, Detroit territory.

L. Randall Thomas, appointed assistant plant manager, American Bridge Div., **U. S. Steel Corp.,** Gary, Ind.

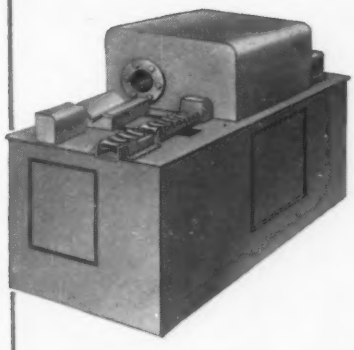
Ray O. Day, appointed sales representative, **Binks Manufacturing Co.,** Denver area.

Lester B. Hibner, named purchasing agent, A. B. Farquhar Div., **The Oliver Corp.,** York, Pa.

Magnethermic brass billet heaters

STANDARD UNITS

Available in 300 and 500 K. W. Single coil designs.



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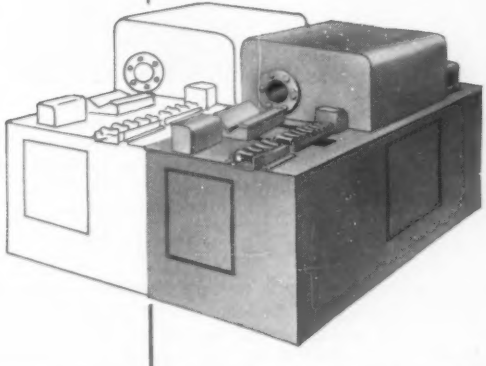
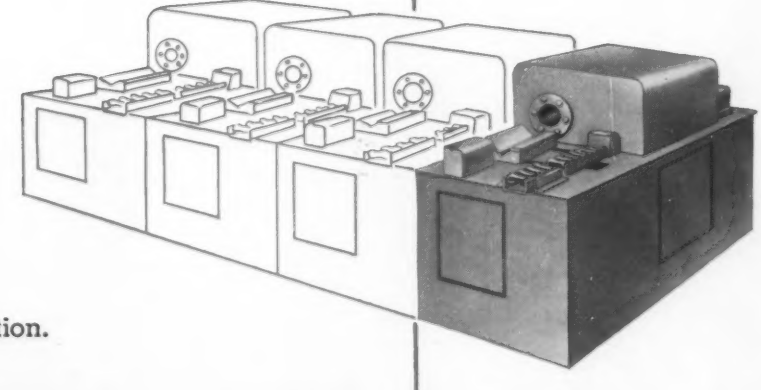
Two or more can be installed together for increased capacity.



AS PRODUCTION WARRANTS

Additional units may be added without disrupting the original installation.



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3990 SIMON ROAD YOUNGSTOWN 7, OHIO
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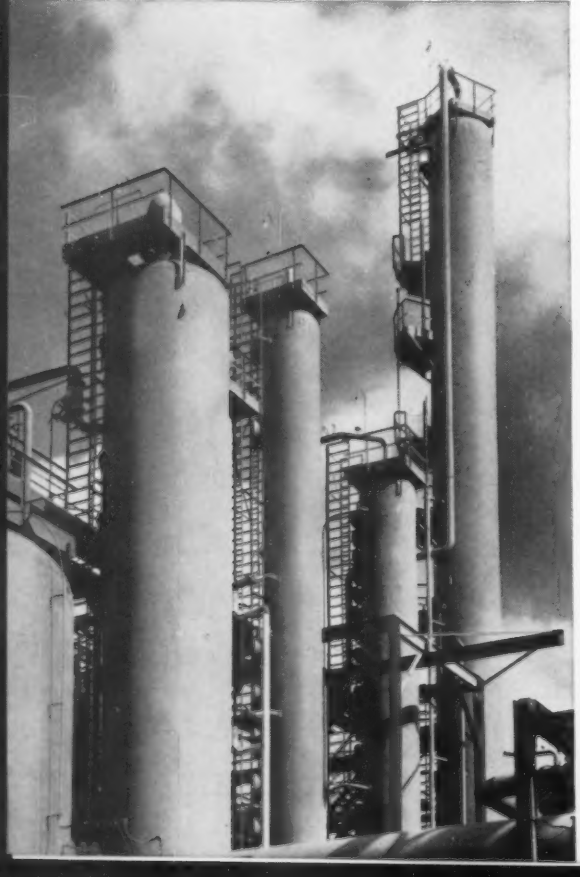
Standardized units designed by Magnethermic. Provide a flexible low-cost method of installing induction heaters on your brass or copper extrusion press. Available in two sizes, 300 and 500 K. W. Multiples of these units may be grouped up to obtain any desired capacity. Install one now, add one later.

NATIONAL SEAMLESS STEEL BOTTLES go underground to store gas the modern way. Safe from all surface hazards, each 39-foot, 3-inch bottle, 24 inches in diameter, will hold 25,000 cu. ft. of gas at 2,240 p. s. i. Before shipment, each bottle is subjected to a high pressure hydrostatic test, assuring the ultimate user safe, long-time service.

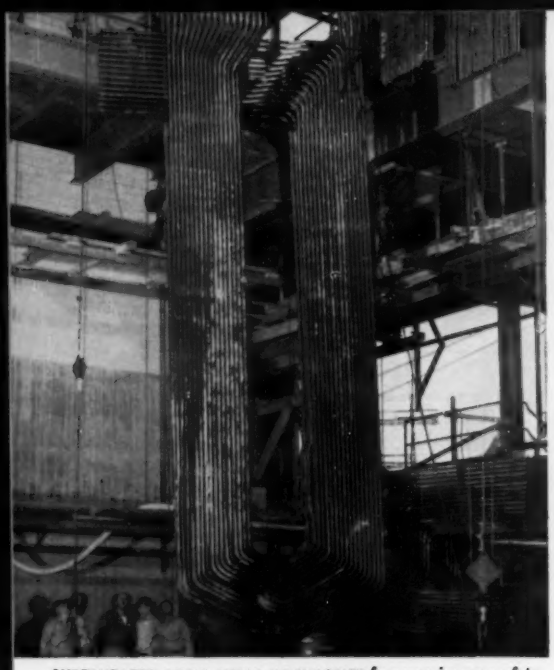
IN THIS 625-MILE PIPELINE, from Wyoming to Missouri, are 45,000 tons of National Seamless Pipe, in sizes of 20, 22, and 24 inches O.D. Service Pipe Line Company laid the line to bring crude oil from the Rocky Mountains to midwest refining centers. Outlet capacity of the line can reach 245,000 barrels per day.

REFINERIES RELY ON 2 DOZEN DIFFERENT ANALYSES made available by National Tube—each designed to handle specific refinery conditions such as corrosion, oxidation, high and low temperatures, and pressures. Other chemical compositions are also available in tubular products, and a wide variety of high temperature problems are now under study.



BACKBONE OF A NATIONAL

THE NATIONAL SEAMLESS METHOD of manufacture is one of the most difficult forging operations in the steel industry. A billet of the finest steel is actually pierced to produce a seamless tube with absolutely uniform wall strength. No welds . . . no joints . . . no weaknesses.



SUPERHEATER COILS BEING POSITIONED for use in one of today's modern giant superheaters. Here, steam at more than 2000 psi is superheated to 1000 F. Severe as this duty is, it poses no problem for National Seamless.

THE 100-TON B-47 STRATOJET has a heavy-duty landing gear, consisting of dual main wheels in tandem which support the fuselage, and single outriggers attached to the inboard engine pods. The outer cylinder of each of these rugged outrigger struts is fabricated from cold drawn tubes of National's Shelby Seamless Mechanical Tubing.

HUNDRED INDUSTRIES...

Seamless Pipe and Tubes

When a giant B-47 Stratojet lands "hard," the undercarriage must absorb a tremendous shock. And when boiler tubes are installed in a modern power plant, they've got to stand up for a long time, under terrific pressures and temperatures. In such applications, where high strength, complete dependability, and long life are so very crucial, you'll always find USS NATIONAL Seamless Pipe and Tubes.

NATIONAL Seamless combines to the highest degree such vital qualities as strength, safety and workability. Uniform throughout and dimensionally accurate, NATIONAL Seamless Pipe and Tubes promise smooth installation and long satisfactory service. Available in a complete range of steel analyses, wall thicknesses and diameters, every foot is produced to exacting standards by the world's largest manufacturer of tubular steel products.

Bring your pipe and tubing problems to National Tube. Regardless of the application, our engineers are interested in discussing the problem with you.

NATIONAL TUBE DIVISION, UNITED STATES STEEL CORPORATION, PITTSBURGH, PA.

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USS

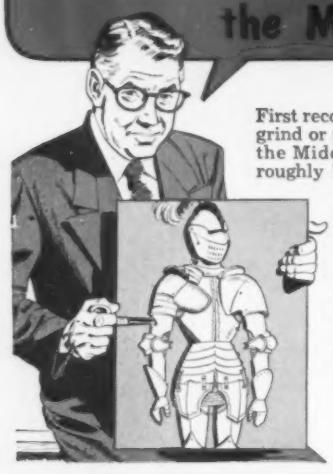
National Seamless Pipe and Tubes

WALLS WITHOUT WELDS

UNITED STATES STEEL

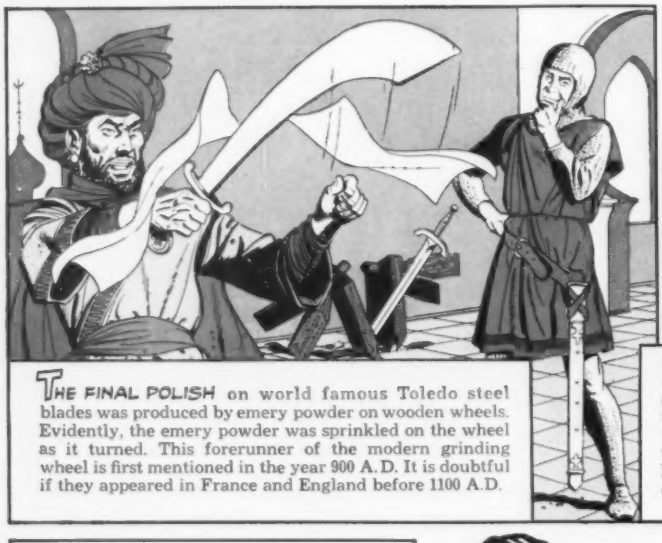
NO. 6 OF A SERIES
ON THE HISTORY OF ABRASIVES
BY CHICAGO WHEEL & MFG. CO.

THE FORERUNNER of the MODERN GRINDING WHEEL appears in the Middle Ages.

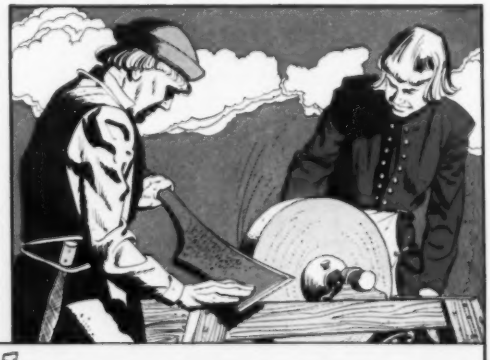


First records of a wheel used to grind or polish metal appear in the Middle Ages—the period roughly between 800 and 1400 A.D. Metal-working reached artistic heights in Europe during this period, particularly in the use of iron and steel for armor. Gold and silversmiths also produced striking examples of their art during this time.

EUROPEAN HISTORY is not specific about the introduction of the vertical wheel for grinding. Many historians believe it originated in the Orient as early as the 3rd century and filtered into Europe during the Crusades, or with the Moorish invasion of Spain. It is known that the blades of the Moors were amazingly sharp, indicating a finish that couldn't have been given them with the forger's hammer or by hand abrading.



THE FINAL POLISH on world famous Toledo steel blades was produced by emery powder on wooden wheels. Evidently, the emery powder was sprinkled on the wheel as it turned. This forerunner of the modern grinding wheel is first mentioned in the year 900 A.D. It is doubtful if they appeared in France and England before 1100 A.D.



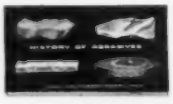
IN ENGLAND at the turn of the 14th century, there are a number of references to "grindstones," one in particular mentioning the "grindstone with an iron-axle tree." Because of the coarseness and irregularities in the grain of the stone, it is believed these were used for less exacting metal grinding, the fine work still being done by hand.

ABOUT THE YEAR 1450 chain mail combined with steel plate gave way to entire suits of plate armor. These are magnificent examples of metal-working, representing the highest skill attained by man in working steel without machinery. The brilliant satin finish on the metal was brought out by burnishing with emery and pumice. The suits were made mobile by clever fitting of metal to metal, ground to exacting tolerances.

Where craftsmen in the Middle Ages had to design and make the tools they required, today's mass production techniques enable us to produce any number of identical tools of the same design. This is true even of such difficult-to-control products as mounted wheels. Chicago Wheel, through positive production control, can now turn out mounted wheels and points which are alike in every detail—in shape, grain, grade, and structure, and in results. We'll gladly send you two samples to test in actual production. Just write us on your letterhead.

CHICAGO WHEEL & MFG. CO.

Dept. IA, 1101 West Monroe Street, Chicago 7, Illinois



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For tough alloys—

Abrasive Wheels Simplify Steel Billet Cutting

◆ In billet form, some of the super-tough steel alloys aren't easy to cut into shorter lengths . . . Burning doesn't always give the required smooth-cut surface . . . Saw blades often find the going too slow for top production economy.

◆ Crucible Steel's Park Works settled on modern abrasive cut-off machines as a universal cutting medium . . . Rubber bonded wheels make short work of the toughest alloys . . . For economy, the worn wheels are shifted to smaller machines.

BY V. E. LYSAGHT, General Sales Manager, American Chain & Cable Co., Inc., Bridgeport, Conn.

CRANE with electromagnet moves large steel billets into position for abrasive cutting.

As the cut-off wheel is fed down hydraulic-

Normal operating cycle for this job is about 3

◆ SHEER TOUGHNESS of the many new alloys designed to resist wear, corrosion and high temperatures often makes it difficult to cut them to required sizes and shapes. But improved abrasive wheels and modern cut-off machines are proving to be a fast, economical answer to this challenge.

For example, five abrasive cut-off units do all the work of cutting steel billets to proper re-rolling length at the Park Works of Crucible Steel Co. of America, Pittsburgh. Choice of this type of equipment was made after careful study. Results prove that the installation has brought significant production gains and cost savings.

The abrasive wheel machines not only do a faster job than former billet cutting methods. They are responsible for two other major savings benefits as well.

One is gained by shifting worn abrasive wheels to smaller machines for continued use before they are finally discarded. The other is that clean, abrasive-cut billet ends mean less scrap, not only in cutting but also in subsequent re-rolling operations.

For its production of rod material and other rolled shapes in a variety of sizes, Park Works receives long billets, up to 5 by 5 in. square, from Crucible's Midland, Pa., plant. Before the billets can be reduced on smaller rolls, they must be sectioned for easy handling and for proper rolling length.

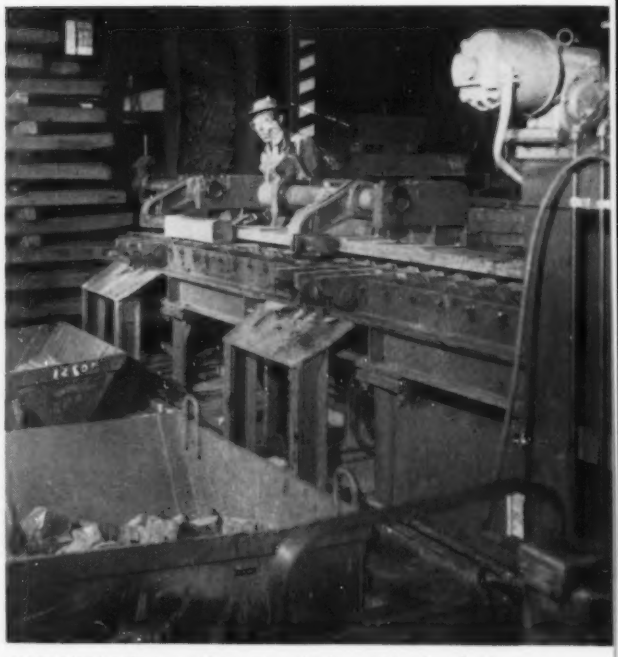
The choice of abrasive equipment as a universal medium for cutting all incoming billets was not based solely on capacity of the machines to handle the various sizes of rounds and squares. Another important requirement was its ability to cut everything from low carbon steel to the toughest, hardest types of alloys. Still another factor was speed, and a need for certain automatic handling features.

No harm to some grades

Some billet grades can be severed by burning without harmful effect. But others tend to crack at the burnt ends. These cracks frequently split open during re-rolling, sometimes badly enough to cause split sections to wrap themselves around the rolls.

The burning technique must also be excluded when billets are to be re-rolled into hollow drill rods. In these cases, the cut ends of the billets must be drilled and then plugged. Cut ends must not only be smooth and square for accurate drilling, but free from any hardening that might be caused by the cutting operation.

On the other hand, low carbon steel billets can be cut satisfactorily with power hack saws and circular cold-cutting saws. But where the tougher alloys are involved, Park Works found that such equipment was too slow and saw blade replacement costs too high.



CUT-OFF billet sections travel down the feedout table for tilt-discharge into bins.

Considering these difficulties with the other severance techniques, abrasive cutting was determined to be the best solution to the overall problem. Five modern units were bought from the Campbell Machine Div., American Chain & Cable Co., Inc., Bridgeport, Conn. Abrasive wheels for this equipment are supplied by the Allison Div. of the same parent firm.

The two largest machines are identical wet-cutting types, capable of severing 8 in. by 8 in. square billets. Another pair of machines will accommodate round billets up to 6 in. in diam. All four of these units are the Cutamatic models which oscillate the abrasive wheel across the work.

Smallest machine of the group is a non-oscillating wheel type. It cuts smaller round billets up to 2 in. in diam, utilizing hydraulic power and motion to plunge the cutting wheel downward through the work.

Bulk of the heavy cutting at Park Works is done on the large oscillating type machines. Operation and performance of one of these units is considerably different than that of a hand fed machine using a small, resin bonded wheel. Oscillating wheel motion across the work is created by a 56 rpm motor and an eccentric drive, and is variable from zero to approximately 4 in.

Spindle of the machine is driven through multiple V-belts from a 25 hp motor. Water soluble coolant is pumped at 33 gpm from a portable tank into a water box designed for most efficient cooling of both wheel and work.

As the cut-off wheel is fed down hydraulically, it passes between adjustable plates in the water box and carries coolant into the cut. With proper adjustment, there is no burning or distortion of the cut surface.

The rubber bonded abrasive wheel used on the large machine is 26 in. in diam, 5/32 in. thick, and has a 1 in. spindle hole. The wheel is held between 5-in. diam flanges, each of which has three drive pins to engage corresponding holes in the wheel. This positive drive arrangement prevents wheel slippage and possible spindle damage.

Usual operating speed is 7000 to 7500 sfpm. For unusual cutting conditions on certain alloys, spindle speed can be varied by changing V-belt pulleys.

First cut discarded

Pawls attached to motor-driven lead screws push the billets onto the feed-in table. Chain-and-sprocket driven rolls then feed the billets into the cut-off machine proper. The operator first cuts off a 2½ to 4 in. section from the entering end of each billet. This portion, the "fishtail" left from previous hot shearing operations, is discarded.

The saw-cut billet is then driven against a combination work stop and measuring gage which is pre-adjusted to length by a motor-driven lead screw. To start the billet cutting cycle, the operator turns a control handle, actuating a hydraulic billet clamping mechanism at the feed-in side of the abrasive wheel. A turn of the control handle to the next position starts the downward motion of the hydraulically powered wheel feeding mechanism.

Coolant flow can be turned on or off at the inlet in front of the wheel guard, although it is usually maintained during the cutting cycle. After the wheel passes through the billet it automatically raises upward, clear of the work. A measuring device on the wheel feed cylinder automatically adjusts the wheel for wear, and also maintains proper wheel travel for the size of billet being cut.

Cut-off billet sections are driven down a roller type runout table to a kickoff point. When a section hits the stop at this point, an air release valve tips the table and the piece slides into a stock pan. A safety control prevents the bar from being kicked off if anyone is arranging bars in the stock pan.

The newest model in the large pair of machines has two kickoff tables. This eliminates loss of time while a crane unloads one of the two corresponding stock pans. Cut-off pieces range in length from 18 to 45 in., and about 25 minutes is required every 6 hours to empty the stock pans.

A typical cutting operation requires a 5 by 5 by 110-in. long billet to be cut into 4 pieces about 26 in. long, each weighing about 179 lb. Normal operating cycle for this job is about 3 to 3½ minutes. During most of this time the abrasive wheel is actually cutting the billet. Only about one-half minute is required for billet feed-in and feed-out.

Actual operating time of a given machine in an 8-hour shift is only about 6 hours and 35 minutes. Thirty minutes is allowed at the end of the shift for cleaning the machine; 10 minutes is required at the start of operations for the operator to check his schedule sheet and set his gage stop; 20 to 25 minutes is needed to change the 4 or 5 abrasive wheels used; and there is a 20 minute stop for lunch.

Park Works gets about 124 good cut-off sections per shift per machine. Because of the ends that are scrapped, it takes 5 cuts to obtain four billet pieces. This means that 155 or more cuts are obtained from 4 to 5 wheels before they are transferred to another machine. Wheels are finally scrapped when they are worn down to a 7 or 8 in. diam.

On 4 by 4 in. square billets, average production per shift is 140 pieces from 4 to 5 wheels that are 17 to 18 in. in diam. With some alloys, wheels of this size will yield 50 or more cuts each before they are worn down to 12 or 13 in. in diam.

AUTHOR'S ACKNOWLEDGMENT

The author thanks Mr. C. Harvey Thompson for supplying much of the technical data.

ONLY one operator is needed to keep billets moving from delivery table to the machine.

New formula does it—

Simple Test Checks Aluminum Coating Uniformity

◆ Quality control, cost considerations in the manufacture of aluminized steel products make a quick, reliable means for checking uniformity and thickness of coatings desirable . . . A simple-to-operate dip test has now been developed for this need.

◆ Technique involved is similar to the Preece test for galvanized steel, but required development of a new solution formulation . . . Method provides accurate gage of coating uniformity, plus an estimate of coating thickness.

By H. J. WITTROCK, Reserch Chemist,
Dept. of Metallurgical Research,
Kaiser Aluminum & Chemical Corp.,
Spokane, Wash.

◆ IN MAKING aluminized steel products, a means for checking uniformity and estimating thickness of the coating rapidly and reliably is highly desirable. A simple-to-operate dip test has now been developed by Kaiser Aluminum Co.'s department of metallurgical research to meet this need.

The technique employed is similar to that of the well-known Preece test used on galvanized (zinc coated) steel. However, obtaining a practicable test for aluminized steel required that a new solution formulation be developed. This must: (a) dissolve aluminum at a sufficient and steady rate, (b) similarly dissolve the aluminum-iron intermetallic compound, (c) clearly demarcate regions of aluminum and, (d) provide a means for estimating aluminum coating thickness.

Numerous solutions, both acid and alkaline, were tested. Finally, a hydrofluoric acid, copper fluoride solution was found which satisfactorily fulfilled the requirements. Composition is 125 milliliters of hydrofluoric acid (52 pct), 50 grams copper fluoride crystals, and water sufficient to make one liter.

The dangers of using concentrated hydrofluoric acid can be minimized by introducing the fluorides as solids. The following formulation is also satisfactory: 160 milliliters of sulphuric acid (96 pct), 150 grams ammonium fluoride or ammonium bifluoride, 50 grams copper sulphate crystals and water to make one liter.

A word of caution. Test solutions should be stored and used in containers made of inert materials such as polyethylene. If kept in glass, the solutions soon become inhibited in action and useless. Also, workers should be careful not to inhale fumes or spray from the solution. Contact with the skin is not immediately injurious but should be avoided. Washing of splashed portions of the skin is advisable.

Procedure is simple enough. When an aluminized steel object is immersed into one of these solutions, the aluminum or any exposed intermetallic compound undergoes an electrochemical displacement reaction, whereby metallic copper is deposited upon all three types of metal surface.

Scoured with brush

The copper covered surface is then scoured under mild pressure, using a fairly soft brush.

Thus copper is easily removed from aluminum and intermetallic compound surfaces, but remains tightly adherent to any bare steel surface. A simple distinction is easy to make between the three metallic layers. The aluminum is bright, with a clear display of grain structure. The intermetallic compound is dark grey and matte. The steel has an adherent copper coat.

Fig. 2 shows the effects of repeated one-minute immersions on aluminized steel strips. The dark gray intermetallic compound begins

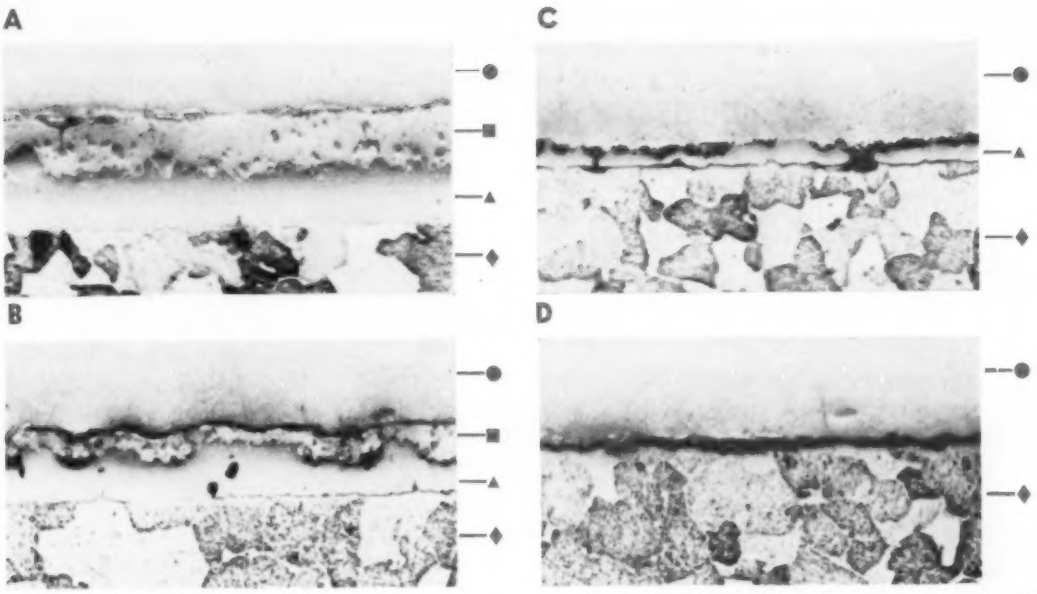


FIG. 1—METALLOGRAPHIC cross-sections show metallic layers, progress of the dissolution. Sequence: As coated (A), after 4 (B), 6 (C), 10 (D) minutes immersion. Magnification is 500X.

●—Copper
■—Al Alloy Layer
▲—Intermetallic Compound Layer
♦—Steel

to appear after about four one-minute immersions. Six immersions completely remove the aluminum except for a few isolated areas.

After eight such immersions, considerable adherent copper remains, while the surface is almost entirely covered by copper after ten one-minute dips. The copper coat is unfortunately not very evident in black and white photos but is readily seen in color. Dark scratches appearing near the bottom of the strips were copper coated after the very first dip. They serve to show how the test brings out the presence of bare steel.

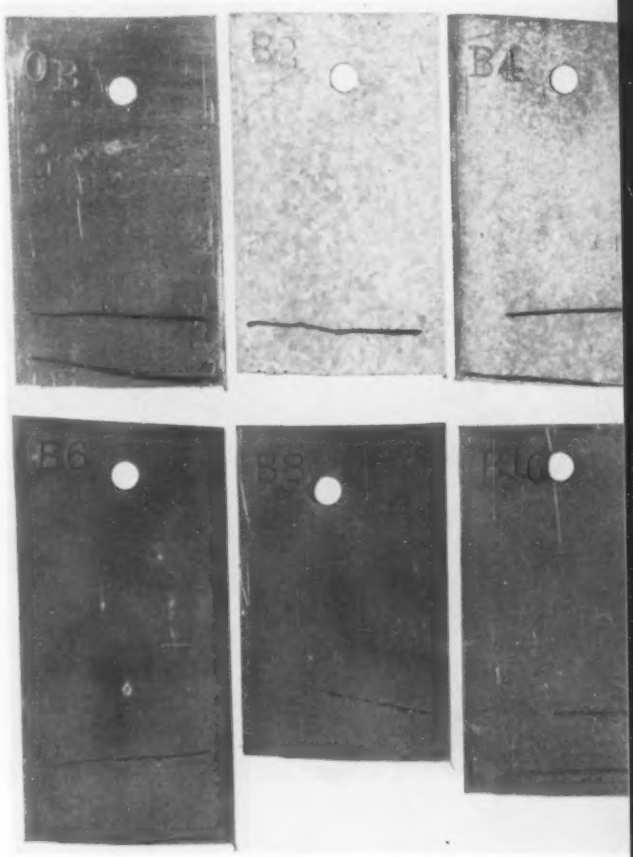
An inspection of the reverse side of the panels shown in Fig. 1, proved the test's usefulness in evidencing lack of uniformity of the aluminum dip-coat on the steel strip. After four minutes most of the aluminum is removed, while on the front side it is still mostly intact.

The rate of dissolution of aluminum appears to be remarkably constant. On specially prepared samples, 0.00023 in. of aluminum is removed per one-minute immersion at 80°F.

This is encouraging for use of the method as a measure of aluminum thickness. But further tests of all kinds of aluminized steel having different alloy coatings on variously shaped parts are needed to establish dissolution rates.

Cleaning parts prior to the test is usually not necessary, since little difference is noted in the rate of attack. However, temperature must be kept at about 80°F, ± 5°F.

FIG. 2—ALUMINIZED STEEL coupons show effects of acid on coated surface after various periods of immersion. Numbers on upper left corners indicated etching time in minutes of each.



Tough-skinned beauty—

Is Bronze Plating Your Next Step?

◆ Bronze plating's golden hues have a twin appeal for metal finishers . . . They offer a promising solution to the nickel shortage as well as a bright new finish for customers' tired eyes.

◆ Under chromium, these copper-tin deposits are said to be more corrosion resistant than copper . . . Plating goes on fast, and throwing power of the bath is excellent.

By **R. T. GORE**, Technical Service Engineer, and **F. A. LOWENHEIM**, Supervisor, Electrochemical Research, Metal & Thermit Corp., New York.

TROPHIES are bright plated in this still bath, followed by light buffing and lacquering.

◆ AMONG THE ALLOY platings which have engaged the attention of metal finishers recently, the copper-tin (bronze) alloy has made outstanding progress. The use of bronze plating as a partial or complete substitute for nickel and copper in the copper-nickel-chromium system is a most promising solution to the present nickel shortage problem.

In addition, the copper-tin alloy offers excellent possibilities as a decorative finish. Its pleasing golden color finds ready consumer acceptance and enhances the sales appeal of many products.

Because of the single anode system which was introduced to replace dual and alloy anode circuits, bronze plating now offers ease of control and reproducible results. It is a thoroughly tested and proven process, definitely out of the experimental stage. Many installations are in operation, ranging from small still tanks to large, fully automatic plating machines.

Boosts corrosion resistance

When copper-tin is substituted for copper in the copper-chromium or copper-nickel-chromium systems, the alloy increases corrosion resistance greatly. Outdoor exposure and salt spray tests are in progress at several laboratories, but complete results are not yet available for publication.

However, considerable practical experience indicates unmistakably that bronze is definitely superior to copper under chromium. It approaches the ideal as a corrosion resistant undercoating.

The bronze alloy, in either the buffed or bright plated condition, also has a very attractive appearance. Its color is richer and more golden than that of brass; in fact it closely resembles 24 K gold.

Bright plating is done by adding a brightening agent to the bath. The bright plate may be chromed directly, or, when the golden color is desired as a final finish, it may be lacquered to prevent tarnishing.

The copper-tin alloy is highly ductile when plated in the matte (dull) condition and is only slightly less so when it is plated fully bright.

In the matte condition, the bronze plate is harder than copper and approaches the hardness of nickel. From a metallurgical standpoint, this makes it superior to copper as an undercoat for chromium. Reported as having a hardness of about 325 on the Vickers scale, the deposit is readily buffable. It does not cut through easily and has less tendency to drag on a buffing wheel than copper.

Excellent throwing power of the bronze plate offers a new approach to the problem of providing proper coverage in the recessed areas of irregularly shaped parts. And it frequently makes it possible to plate articles directly that could not be covered satisfactorily in a copper strike without special racking fixtures.

A high rate of deposition is another important characteristic of the bronze alloy. The bath operates at high cathode current efficiencies, well up on the current density range.

At 30 amps per sq ft, the solution will deposit 0.0003 in. in 10 minutes. Plating speeds in excess of 0.0001 ipm have been attained at current densities over 100 amps per sq ft. These deposits were satin-smooth in appearance and showed no excessive buildup or nodules at the edges.

Because the bronze alloy can be plated in either a dull or fully bright condition, it has many possible applications. The excellent properties already described suggest its use where more corrosion resistance, increased covering power, or a color change for new sales appeal might be advantageous.

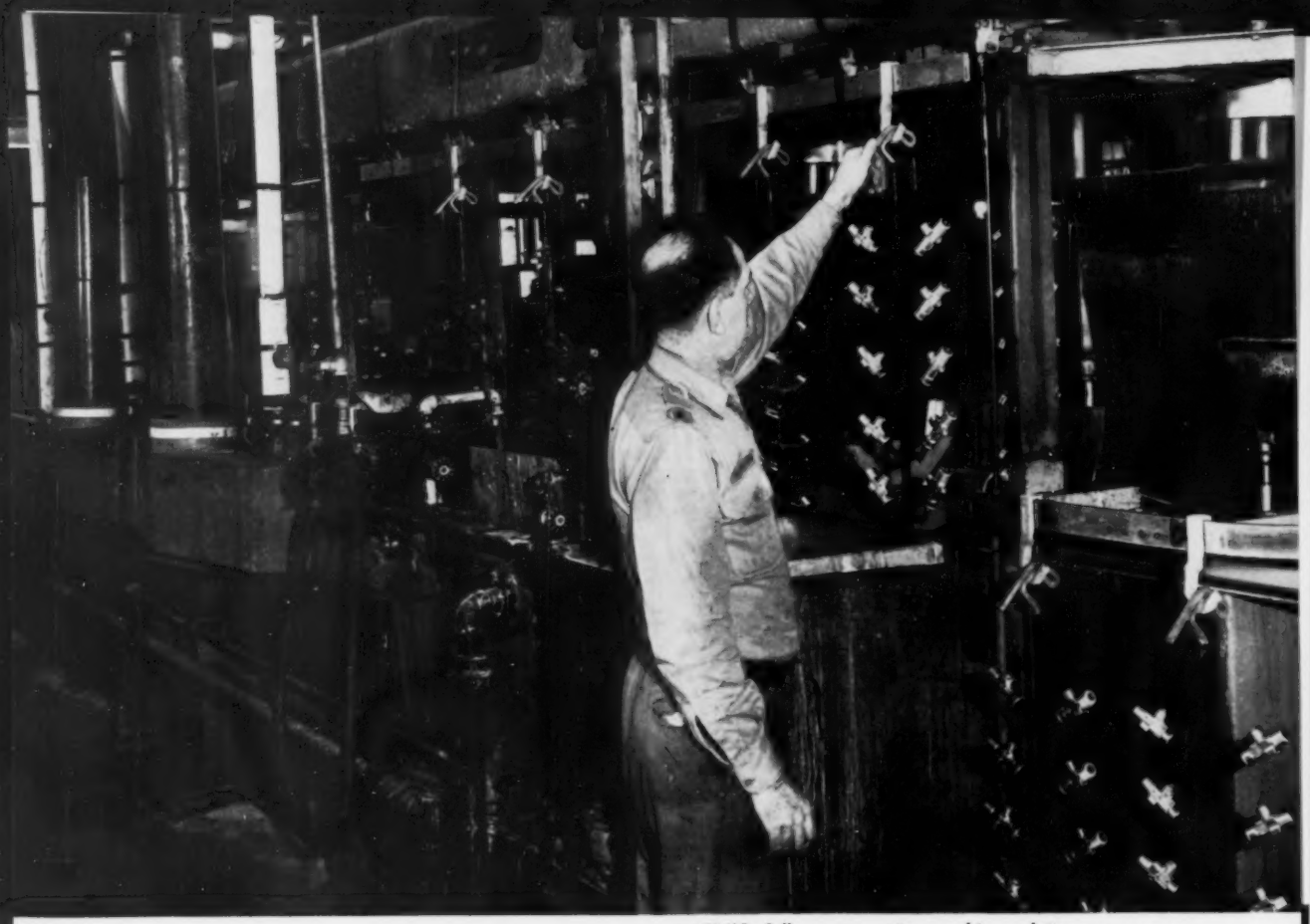
In addition to its suitability for plating on

Can You Use These Benefits?

Bronze Plating Gives You—

1. **Better corrosion resistance under chrome finishes.**
2. **A bright or a matte finish resembling 24 K gold.**
3. **Throwing power to plate recesses without special racks.**
4. **A harder finish for easier buffing.**
5. **Fast deposition and a smooth surface.**
6. **A direct deposit on zinc base alloys.**
7. **Economy in ease of solution control.**

CAST zinc trophy cups acquire a rich golden color in a single bronze plating operation.



THIS fully automatic machine plates a copper-tin deposit on brass fire extinguisher valves.

all the usual basis metals, the copper-tin alloy can also be plated directly on zinc base die castings. This can be done without prior flash plating, provided correct pre-treatment is applied. Direct plating in this manner can bring substantial savings. Since a strike is unnecessary, one plating operation and one or more rinses are eliminated from the cycle.

Eliminate undercoating

Typical industrial applications of the copper-tin alloy deposit frequently benefit from all three of its primary characteristics: Decorative appearance, corrosion resistance and plating speed.

For example, Arlen Trophy Co., Brooklyn, uses the bright plated and lacquered alloy as the final decorative finish on its line of trophies and awards. The trophy cups and figures which symbolize various sports and activities are cast from a zinc base alloy.

Formerly, these parts received copper and nickel undercoats followed by a gold flash. The changeover to the copper-tin alloy not only produces an attractive gold color in a single plating operation; it also eliminates completely the need for undercoating. And since the solution uses a brightener, only a light buffing touch-up is required.

Pre-cleaning and preparation of the trophies for plating is done by conventional techniques. After removal of parting-line flash, the castings are color polished, degreased and buffed lightly. They are then plated for six minutes in a still tank containing the copper-tin solution. Final treatment is the aforementioned light buffing and spray lacquering.

Another firm, Pyrene Metal Finishers, Inc., Newark, N. J., uses copper-tin alloy plating principally for its resistance to corrosion. The alloy is applied under chromium on cast brass valves for fire extinguishers. Such equipment is frequently exposed to corrosive atmospheres.

The firm formerly used a "bright" copper under the chromium. However, the copper deposit was not bright enough to give a good chromium finish. It still required a bright dip. But this dip removed some of the copper, with consequent loss of corrosion resistance.

The bronze alloy used at present is plated bright, and no dipping or buffing is needed to enhance its value as a superior base for the final chromium coating.

Plating of the extinguisher valves is done in

a fully automatic Udylite automatic plating machine. The machine advances the work in a timed cycle and returns it finally to the operator's station.

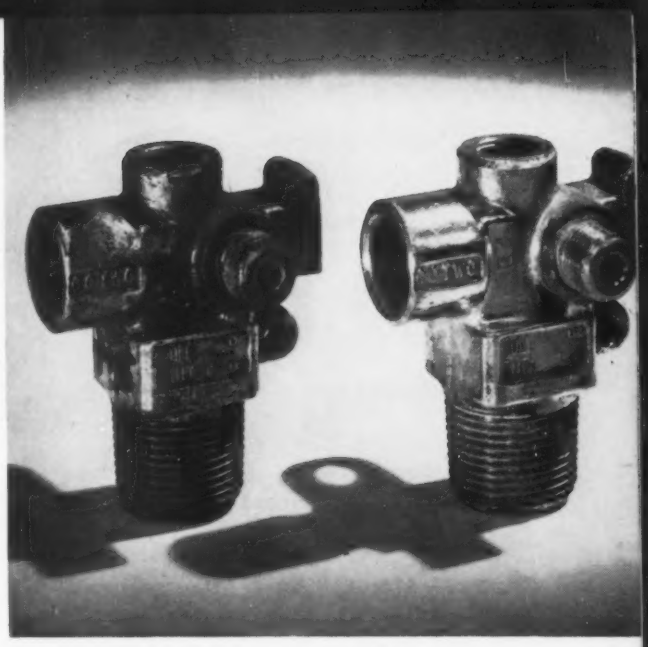
Laboratory tests confirm the superior corrosion resistance of the copper-tin undercoat compared to an equal thickness of electrodeposited copper. Two chromium plated valves, one with copper under the chrome, the other undercoated with copper-tin alloy, were exposed to a corrosive hydrogen sulphide atmosphere for 22 hours. The copper base specimen was badly corroded at the end of the test period while the bronze undercoated valve showed excellent resistance to chemical attack.

Cyanide-stannate bath best

Copper-tin alloys can be plated from several types of solutions, but the ones found to be most practical are of the cyanide-stannate type. These baths contain copper cyanide, alkali cyanide, alkali hydroxide, alkali stannate and an addition of material to promote anode corrosion.

The baths used in the typical installations described are of such type. They use the potassium salts throughout (except for the copper cyanide, of course) and also use Rochelle salts (sodium-potassium-tartrate) for anode corrosion. The tin content of the solution is maintained by additions of potassium stannate; the copper by anode corrosion. Copper anodes alone are used.

Control is simple. Important factors are operating temperature, and the concentrations of free cyanide and free alkali. Small variations of the metal content have a negligible effect on the composition of the deposit.



VALVES after corrosion test. One at left has copper under chromium, right one has bronze.

Normal percentage of constituents to produce the golden color is approximately 88 pct copper with 12 pct tin. High temperature and high free cyanide with low free alkali will result in a higher tin content of the deposit, thus yielding the golden color. Lower temperature, with lower free cyanide and higher free alkali favor the deposition of higher copper content with a red bronze color.

The concentrations of cyanide and alkali are determined frequently by standard methods, and adjusted as desired.

When plating in the fully bright condition, the brightener concentration must be controlled. The standard Hull cell is convenient for this purpose.

The solution may be treated for organic contamination by carbon filtration. Metallic impurities are removed by low current density electrolysis using dummy cathodes.

No special equipment is necessary for bronze alloy plating. Unlined steel tanks are satisfactory.

The excellent results obtained with the cyanide-stannate baths described are attributable to the substantial amount of research done on plating baths of this general type. Not only have variations in bath compositions been studied, but also the types of anodes used, including tin alloy (bronze) anodes.

Continued research in tin alloy deposition is aimed at even better results from the process. These studies are giving special consideration to plate characteristics, and also to raw material costs, including both chemicals and anodes.

Try Bronze Plating For—

- **Decorative appeal as a bronze finish or to simulate 24K gold.**
- **Undercoating nickel plate**
- **Undercoating chrome plate to replace copper and save nickel**
- **Replacing copper and increasing corrosion resistance under brass.**
- **Replacing copper wherever a harder, less porous undercoating is desired.**

No furnace, less handling—

Resistance Heating Boosts Forging Efficiency

◆ Flanged rear-wheel axles for motor vehicles are being forged by a German firm with modern upsetting machines, friction forging presses, after parts are heated by electrical resistance method.

◆ Results are improved economy and accuracy, simplified handling, excellent structure . . . Overheating, underheating are avoided . . . One or two workers handle entire forging sequence . . . Power consumption is low.

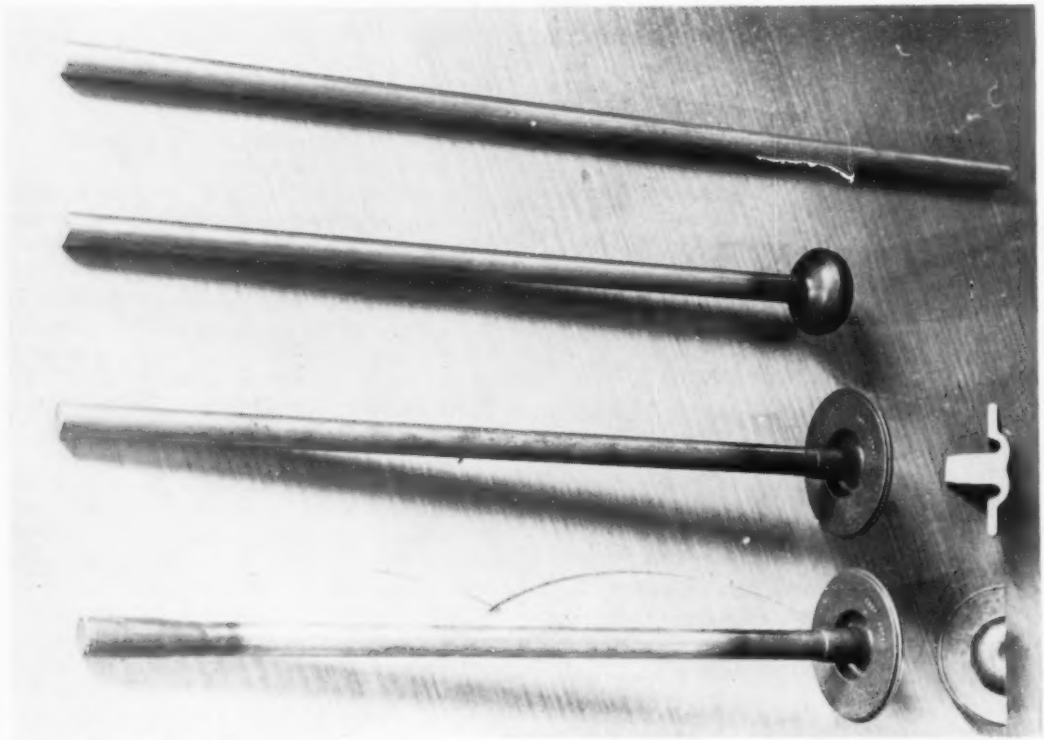
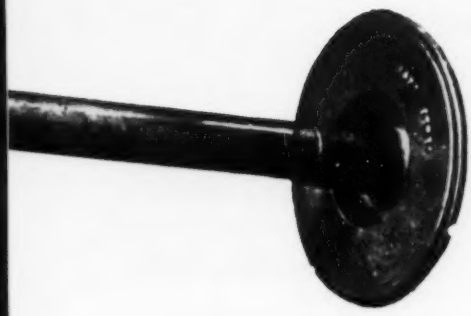


FIG. 1. Four phases in making rear axles for motor vehicles show alloyed structural steel blank, blank after electrical-resistance-heating and upsetting, after flanging, swaging operations.



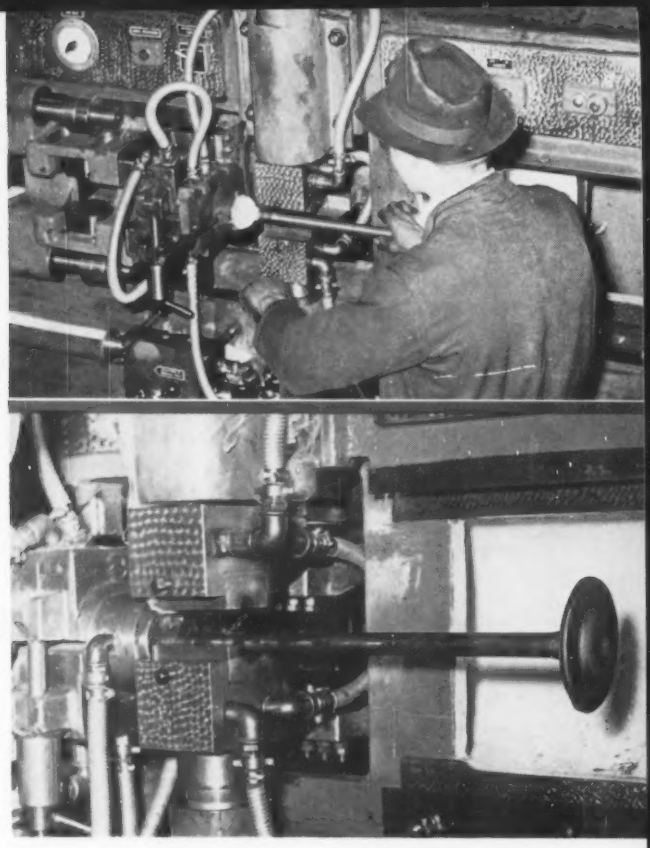


FIG. 2. (Top) Initial upsetting operation on the electric upsetting machine produces head with smooth surface, excellent flow line configuration. Temperature (about 1180°C) is right for next forging operation without reheating.

FIG. 3. (Bottom) Completely finished flange is shown during ejection from the friction forging press, before tool is swung back. One stroke of this press produces desired flanged shape.

◆ MODERN UPSETTING MACHINES which heat parts by electrical resistance are being used with friction forging presses for precision forging of rear wheel (differential) axles for motor vehicles. The new method for forging flanged shafts improves economy and accuracy, simplifies handling, gives uniformly good quality.

The flange was formerly made in several steps. Working with material of considerably larger thickness than the finished shaft, Hasenclener AG, in Dusseldorf, Germany, first drew or tapered the thin shaft part of the differential axle on a recoil forging roller or a heat reducing machine, while the spline shaft end and the initial part for the flange were left unchanged. The subsequent upsetting operation on the comparatively sizable flange required an extremely sturdy forging machine, so that tools could be arranged for at least three operations.

With the new setup, differential flanged axles are produced in four operations, without intermediate heating.

Operation starts with an alloyed structural steel blank of 1 in. diam—exactly equal to the shaft part of the finished axle. The flange end is heated to a forging temperature of about 1180°C (2160°F) and is simultaneously upset in one work process on the electric upsetting machine. As no wastage and no forge scale worth mentioning occur, no additions for upsetting have to be provided.

Semiautomatic upset cycle

All work processes including heating take place automatically once the operator has placed the bar blank between the chuck parts of the machine and depressed a foot contact. When the upsetting operation is completed a new blank can be immediately inserted, and depressing the foot switch starts the new cycle.

Actual electric upsetting of the flange takes about 30 seconds, plus about 5 seconds for handling and idle motion. Overheating and underheating are not worries if the machine is properly adjusted. The upset head produced combines a smooth surface with a very desirable flow line configuration.

Since work emerges at proper forging temperature of about 1180°C (2160°F), it can move directly and without intermediate heating to the friction press. One stroke of this machine shapes the upset head into a definite flanged form.

The friction forging machine is fitted with an electro-pneumatic auxiliary control so that the operator has his hands free. An adjustable power proportioning device on the press is essential, to adapt the hammering work capacity to the requirements of the job. Power proportioning is hand-wheel regulated and can be read on a calibrated scale. Once set, the press strikes with uniform power, so that any lack of skill or fatigue on the operator's part cannot affect the quality of the work.

The finished flange and the remaining shaft

"In the process described, minimum additions are required only on the bearing surfaces to be machined . . . Remaining surfaces are smooth, accurately forged . . ."

have very accurate and uniform dimensions. The shaft remains cold. Thus the job can receive the thickened part for the splined shaft end in the last work process without need for a subsequent adjusting operation on the second electric upsetting machine.

The electric swaging machine into which the work is next inserted also operates semiautomatically. The pure swaging period involved is about 8 seconds. Add 6 seconds for handling and idle motion, for a total time of perhaps 14 seconds. A new job can be worked immediately on the electric swaging machine as soon as the completely forged differential axle is removed and a new flanged shaft inserted.

In producing rear wheel axles by the process described, it is worth noting that minimum additions are required only on the bearing surfaces to be machined. Remaining surfaces including the shaft are smooth and accurately forged. No finishing operations are required, and the strength of the part, which is subjected to great stresses in service, will not be reduced by any starting cracks or scores.

Production rates

Number of pieces obtainable with the plant depends on upsetting machine performance, generally about 35 seconds for each initial upsetting of a flange, or 100 pieces per hour. A trained worker can simultaneously operate the press and one electric upsetting machine. With a second operator working the swaging machine, the plant can turn out 800 completely forged differential axles in an 8-hour shift.

Production figures of the plant are clearly summed up in the accompanying table. The tool cost component refers to a production of 30,000 axles, or until the set of tools is worn out. If larger quantities are forged, the cost component will be reduced because a large number of the tools can be put to productive use again by retooling.

The friction forging press is not fully used with the plant described. Three electric upsetting machines are necessary for initial upsetting of the flanged head if the efficiency of the press is to be fully exploited. This would require another worker, but would triple output of the plant while only doubling time used in minutes.

This forging plant has proved very satisfactory in practice. It is suitable not only for producing differential axles, but can be used also for many other forged parts where material is to be headed.

Production Data

▪ Plant production figures are summarized in this table. To realize fullest efficiency from the friction forging press, three electric machines for initial upsetting of the flanged head would be required.

Dimensions of the blank	1 x 37⅛ in.
Heated length for flanged head	12⅛ in.
Heated length for spline shaft head	3⅛ in.
Total heated length of shaft	16 in.
Total heated weight for a shaft	2.2 lb
Electric energy expended in upsetting of a shaft	0.546 kwh
Electric energy expended for the pressing of a shaft	0.156 kwh
Total electric energy per shaft	0.702 kwh
Working time expended per shaft	50 seconds
Cost component for tools of the electric upsetting machine	
bronze parts	28.6 lb
steel parts	37.4 lb
treating period	2300 minutes
Cost component for tools of the friction forging press	
hot die steel	374 lb
treating period	2700 minutes

Improvements Summarized

▪ Here are some of the more evident advantages realized with the forging plant described in this article:

1) **Accuracy, uniformity of jobs.**
2) **Quality of internal structure.**
3) **Eliminates need for furnace heating.**
4) **Immediate working readiness without fuss.**
5) **Only portions to be worked need heating.**
6) **Avoidance of overheating or underheating, with resultant savings of material.**
7) **Easy operation — one or two workers suffice.**
8) **Very economical power consumption.**
9) **Only single set of tools required.**
10) **Rapid and simple changing of tools and rapid conversion for another job.**
11) **Small floor space, easier inspection.**

Multiple-pass technique—

"Cold Weld" Nickel Alloys for Atom Plant Use

◆ Metal apparatus in atomic energy plants must perform reliably, often under severe pressures and temperatures in highly corrosive atmospheres . . . This calls for the best of materials and quality fabrication.

◆ For example, here's how a "cold" metal arc welding technique insures sound, pore-free joints in a nickel alloy pump . . . The process features low temperatures, an argon gas shield, and multiple passes with small diameter rod.

By E. NUTTER, President, Elano Corp., Xenia, Ohio

◆ PRODUCTION OF atomic energy involves a number of complex operating and service conditions that are rarely encountered in the average industrial plant. High temperatures, excessive pressures and extremely corrosive conditions are some of the more common problems in nuclear power installations.

To produce machinery and equipment that will operate reliably under these conditions often requires rather unusual variations of standard metal fabricating techniques.

An example of this practice is found in the weld joining of a specially designed centrifugal pump, made of nickel alloy components. It is manufactured for the Government in the production welding shop of the Elano Corp., Xenia, Ohio.

Since these pumps handle very hot, corrosive fluids at extremely high pressures, a special nickel alloy is used. Sound, uniform welds are obtained by using an inert gas arc welding technique, and making multiple passes with a smaller diameter welding rod.

The complete pump consists of about 20 separate parts welded at different points. The pump body measures about 16 in. in diam.

Prefer argon shield

Because absolutely sound, pore-free welds are essential for the pressure-temperature application involved, inert gas arc welding is used exclusively. Argon is utilized in preference to helium because its heavier atomic weight and better shielding action produce consistently clean root surfaces for every bead as laid down.

Since nickel alloy weld metal does not spread or flow as well as some other materials, and the penetration is not as deep, excessive heat input had to be avoided to prevent serious re-

A typical joint takes approximately 40 passes to build up 2 in. of weld metal . . .

sidual deoxidizer loss. A combination of joint design and welding technique was worked out that requires a heat input of only about 60 amps, even for weld sections up to 2 in.

Because of the shallow penetration characteristics of nickel alloy weld metal and the desirability of lower weld temperatures, it was found that multiple passes with 3/32 in. diam. rod were required. This is the so-called "cold weld" technique.

A typical joint, such as welds the outlet port to the impeller housing, requires approximately 40 passes to build up a concentration of weld metal measuring 2 in. through its heaviest section. Contrary to accepted practice, a straight type bead is laid down; the usual weaving motion is not used as it deposits too much metal and encourages detrimental puddling. Instead, a dipping action is used wherein the weld rod is dipped into the parent metal as it becomes molten. This action is repeated at a steady rate until the bead is completed.

Inhibits grain growth

The low operating temperature of the multiple pass, narrow bead technique produces only slight grain growth in the fringe area of parent metal. It also creates a uniform structure in the weld metal as it builds up. The end result is a strong, ductile and sound weld approaching the maximum mechanical properties attainable with cold drawn nickel alloy rod. Furthermore, corrosion resistance in the weld area is equal to that of the parent metal.

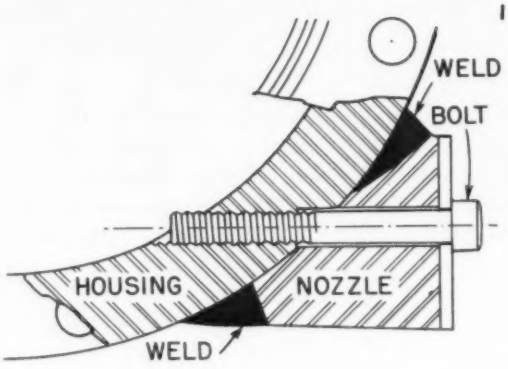
The necessity for producing weld metal properties like those of the base metal can be seen in the accompanying drawing. This shows that after the outlet port is bored to extremely close tolerances, a considerable part of the resulting port wall is essentially weld metal. This metal must be of the same strength and ductility as the base metal to continually maintain its contour under the high pressures involved.

Conditions of absolute cleanliness are maintained at all times for parts being welded and also for the weld metal as it is laid down in the joint. At welding temperatures, nickel and high-nickel alloys are highly susceptible to contamination and embrittlement by lead, sulfur, phosphorus, and other low melting point alloys and metals which may be present around the shop. Grease, oil, paint, fingerprints and perspiration spots will also cause trouble unless they are removed.

To insure clean work, each part is vapor degreased and given a carbon tetrachloride rinse before it is set up for welding. Employees wear gloves at all times during handling.

Ten Steps to Quality "Cold Welds"

1. Vapor degrease all parts.
2. Rinse in carbon tetrachloride.
3. Remove excess base metal with files or burrs only (no abrasives). Clean out particles with stainless steel wire brush.
4. Set up work for welding. Handle all parts with clean gloves.
5. Lay down a straight bead.
6. Inspect job by penetrant dye method.
7. Cut back each weld bead to sound metal.
8. Repeat welding passes and inspections until sufficient sound metal is built up.
9. Heat treat in helium and hydrogen atmosphere at 1500°F.
10. Final inspection and pressure test.



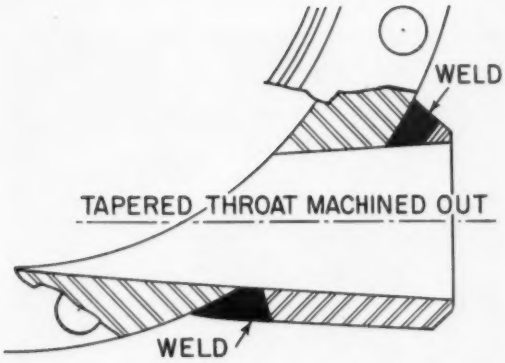
If any metal has to be removed from the joint area before or during welding, it is machined or filed or burred away—*no abrasives* are ever used. The resulting chips or filings are immediately removed with a stainless steel wire brush.

The 99.8 pct pure argon gas which shields the weld has excellent cleaning action and requires lower arc voltage and heat input than helium. This monatomic gas not only produces a smooth quiet arc but also minimizes erosion of the tungsten electrode and eliminates porosity in the weld metal.

Rod is hand fed

To further insure the best joints, all welds are made in the downhand position with the electrode at an incline of about 20 degrees from the vertical. The bare rod is hand fed by the operator. It is held at the recommended slight angle and carefully drawn straight along the joint to produce a straight bead. The ideal average welding speed at 60 amps is less than one inch per minute.

The direct current rectifier type welding ma-



Left: **Welding the outlet to an impeller housing takes about 40 passes with 3/32 in. rod.**

Above: **Final machining of outlet nozzle removes some parent metal, some weld metal.**

RECTIFIER type dc machine used for argon shielded metal arc welding operates at 60 amps.

chine used for this work is equipped with a crater eliminator that automatically reduces the current and voltage at the end of each pass. It not only prevents the formation of a crater but also provides an excellent condition for the restrike.

By using a copper striking block, positioned against the piece and slightly above the joint, the restrike can be safely made against this block and the electrode drawn down the piece to the joint. This action minimizes the possibility of contaminating the weld metal with tungsten.

After each bead is laid down, it is carefully checked for soundness by the liquid penetrant dye method. However, voids that are initially visible to the eye are removed before this dye check. When voids or imperfections are detected by the developer fluid, the bead is cut back by a rotary metal burr (never an abrasive) until subsequent dye checks reveal sound metal. All dye material is carefully removed before the next pass.

This dye test is repeated in some joint areas as many as 40 times, until the required amount of sound weld metal has been fully built up.

To meet the specifications dictated by service life requirements, each part receives a stabilization heat treatment at 1500°F. To protect the metal surface from oxidizing and also to retard any intergranular corrosion that might be caused by the iron in the alloy, an atmosphere of inert helium and 30 pct hydrogen is used throughout the 40 hour cycle. Heat treatment is carried out in a full muffle type electric furnace which is equipped for forced circulation of the protective atmosphere in the muffle.

The work is charged on special fixtures. Each charge is heated to 1500°F and held at that temperature for 24 hours. It is then slow cooled (8-10 hours) to room temperature before subsequent final machining operations.

Need stress relief

Heat treatment is not often required for weldments of nickel alloys unless the ultimate in mechanical properties is required. Then a high temperature stabilization process must be used. Hot worked nickel alloys require this stress relief to develop the best combination of strength and ductility and also to insure against any distortion and warping during subsequent machining.

After final machining these welded assemblies are tested for leakage. For this test the parts are heated to 250°F and put under an internal pressure of freon gas at 5 psi.

It is generally assumed that the use of atomic energy is certain to become more widespread for electric power generation, industrial production, and research and development. As this occurs, other so-called standard fabricating techniques will most likely be modified to make the necessary reliable components.

Solder Pellets Double Can Production

PELLETS are dropped on either side of handle after it is fluxed and placed on the can.

• BY SWITCHING from manual methods to automatic soldering of spouts and handles, an Eastern can manufacturer has eliminated a production bottleneck. Now, the use of specially shaped solder pellets and automatically applied heat has just about doubled company output of 1-gal cans.

Labor costs have been considerably reduced, rejects have dropped from over 5 to ½ of 1 pct, and a 2½ pct saving in finished products has been realized by reduction in the amount of materials previously wasted.

Earlier method

The former method of attaching spouts and handles to the cans consisted first of pre-tinning them by dipping into molten solder. After tinning, they were set aside until a sufficient quantity had accumulated for a hand soldering operation. This method resulted in production slowdowns, some rusting of these parts, waste of materials and a certain proportion of improperly soldered joints that failed in service.

The first step in improving production was the installation of an 8-in. belt conveyor line to carry the cans from initial to final stages of assembly. After the can body has been formed and the bottom and top lids crimped to it, the can is sent on to the soldering section.

Here, spouts are attached first. With one hand a worker dips the bottom rim of the spout into a trough of acid flux and sets the spout on the hole. In his other hand he holds a quantity of shaped solder pellets and puts just one at the juncture of each spout and lid.

The can is next conveyed under a row of four gas burners, each burner progressively building up the temperature of the can metal to a degree just hot enough to melt the solder pellet. The solder flows around the spout by capillary action and hardens to a tight, permanent seal by the time the can has moved a few inches beyond the burner assembly.

The can then passes to the next stage where the assembler dips the edges of the handle in acid flux and positions it on the can. He then places a single solder pellet on each side of the handle before the can is carried beneath another series of gas burners. The flames localize to the handle so that the heat is conducted to the joints. As the pellets melt, the solder flows around the edges of the handle, effecting a total bond of the two parts.

Even though the can has been painted before spouts and handles are soldered, the heat applied is not enough to cause paint damage.

The solder pellets manufactured by the Anchor Metal Co., ensure that just the right amount of solder is available to do each individual job well, without waste or unsightly joints. The shape of the pellets (in this case triangular) is one of scores that can be produced, even down to microforms only 0.015 in. in diam for precision production soldering.

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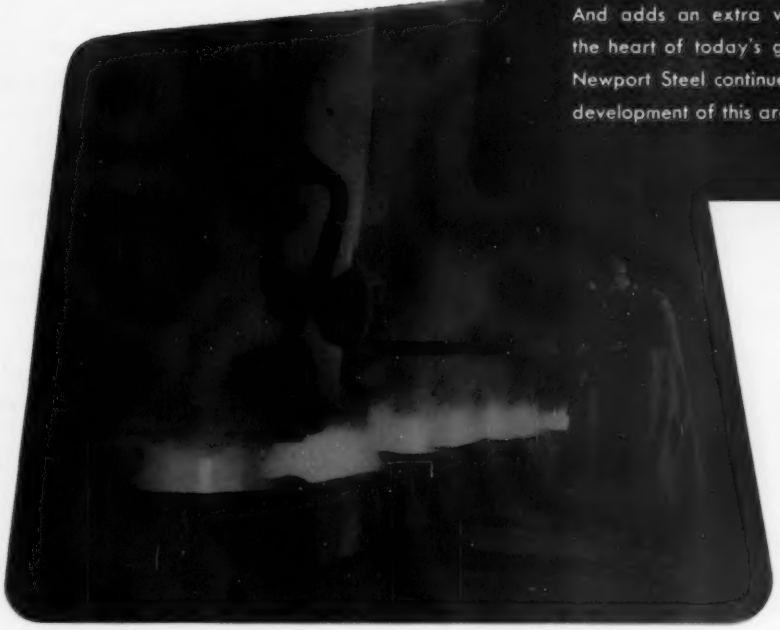

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Colorbond Sheets
Electrical Sheets
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New Technical Literature:

Catalogs and Bulletins

Marking dies

"Press Style Marking Dies," is a manual on stamping and embossing dies, roller dies, holders and type numbering heads. It contains a section dealing with basic information on the use and selection of steel dies for many applications; as well as a section on steel stamping, embossing and foil leaf marking dies; a section on press-style type holders, tool post holders for marking around the peripheries of cylindrical or round-tapered parts; and numbering heads for embossing or debossing *Jas. H. Matthews & Co.*

For free copy circle No. 1 on postcard, p. 121

FOR YOUR COPY

Money-saving products and services are described in the literature briefed here. For your copy just circle the number on the free postcard, page 121.

Solvent detergents

The cleaning uses and abilities of solvent detergents — solvents compounded with surface active agents —are described in a recently revised booklet. The 16-page, illustrated booklet tells how solvent detergents, used without heat, are designed to remove oily films, smuts, cutting, drawing and stamping compounds, zinc chromate primers from aluminum, and synthetic paints from steel, while providing temporary protection against rust after painting. *Write on company letterhead to Oakite Products, Inc.*

For free copy circle No. 2 on postcard, p. 121

Speed reducers

Details on a line of shaft mounted speed reducers are presented in Bulletin CD-400. Dimensioned assembly drawings, hp and torque rating charts, and application photographs illustrate the new 12-page, 2-color booklet. Specifications on bore sizes and gear mountings plus mounting instructions are included. *Michigan Tool Co.*

For free copy circle No. 3 on postcard, p. 121

Finishing systems

A new 16-page color bulletin (No. 51) on metal finishing systems is illustrated with photographs, drawings and diagrams. It contains suggestions, tips and ideas on ways to achieve finishes at lower cost, faster production and smoother handling on numerous products such as power tools, automobile frames and refrigerators. Discussion of completely engineered finishing systems is included. *Despatch Oven Co.*

For free copy circle No. 4 on postcard, p. 121

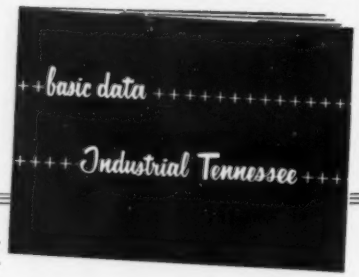
Hydraulic aid

"Trouble-shooting Chart for Hydraulic Systems" is the subject of a new wall chart now offered by Sun Oil Company. This 2-color chart, designed for display in shops, has been planned to help operators and maintenance men spot and cure common troubles. *Industrial Products Department, Sun Oil Co.*

For free copy circle No. 5 on postcard, p. 121

Short Cut for Executives Considering

NEW PLANT SITES



This 28-page booklet outlines, without exaggeration, the principal advantages of a state which has been designated by industrialists already located in Tennessee as "America's No. 1 Industrial Opportunity."

From the booklet you can get a clear picture of Tennessee towns and cities, markets, labor, raw materials, fuels and power, transportation, industrial capacity and diversification, living conditions, industrial tradition, recreational facilities, and the close cooperation you will obtain from Tennessee officials in choosing the exact location you need.

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FREE TECHNICAL LITERATURE

Hardsurfacing alloys

A recently developed line of hardsurfacing alloys is described in a new publication. The materials discussed consist of alloy-filled tubes, either in coils for automatic welding or for cutting to length for manual application. Included for each alloy are composition, description, welding specifications and characteristics of hardsurfacing deposit. *Coast Metals, Inc.*

For free copy circle No. 6 on postcard, p. 121

Tool holders

A new 4-page descriptive bulletin, 5510-M covers a series of holders for no-grind indexible carbide inserts with adjustable chip breaker clamps. The folder lists prices as well as specifications for the 78 models of these holders, designed for boring, turning, chamfering, plunge cutting, recessing and other related operations. Typical application sketches as well as tool drawings are shown. *Wesson Co.*

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Adhesives

A new 12-page, 2-color catalog listing properties and applications of a wide variety of adhesives, coatings and sealers is now available. Typical applications for adhesives, coatings and sealers in the metalworking, transportation, general manufacturing, electrical manufacturing and building products industries are listed in comprehensive tables in the catalog. Tables include: general type of application, specific examples, characteristics, method of application, color, base, solvent, solids content, and net weight. *Minnesota Mining & Mfg. Co.*

For free copy circle No. 8 on postcard, p. 121

Indicators

Bulletin 7202 describes the new Honeywell Tel-O-Set vertical scale indicator. Up to date information on other recorders and controllers is also included. These miniature instruments are described as used to measure and control variables such as temperature, pressure, flow, and liquid level. *Minneapolis-Honeywell Regulator Co.*

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To order Malleabrasive, or for additional information on running a test, contact Globe Steel Abrasive Co., Mansfield, Ohio.

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The old-timers said it couldn't be done in less than five days — but Barry Leveling Mounts so speeded the reinstallation of lathes, millers, and grinders that the entire moving operation took only a two-day weekend. The vital test-preparation department was ready for work again on Monday morning. The machines set on Leveling Barry Mounts required no drilling of floors, no lagging, no shimming — they were just spotted according to plant layout, and quickly leveled. And because Barry Mounts isolate vibration, the machines do not walk, building-borne noise is reduced, and the accuracy of the precision machines in the Test-preparation Department is protected.

Ask Barry how YOU can cut machine-moving costs.

How Did Bullard Stop ALL Toolroom Rejects Due to Vibration?

With the Bullard Company's toolroom only 50 feet from a main-line railroad track, the vibration from passing trains often caused work spoilage or lost time as grinder operators waited for trains to pass. Moving the toolroom was out of the question. But the seven surface grinders were isolated from external vibration by a simple installation of Leveling Barry Mounts under each machine — at a cost of only $50 per machine. Rejects due to vibration were completely eliminated!

Ask Barry how YOU can protect precision machinery.

How Can YOU Gain These Advantages?

It's easy. Write for our plant survey booklet M-256 that tells you where to look for savings in your plant, then talk over your machine-mobility needs and vibration problems with a Barry representative or Barry Mount distributor.

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FREE TECHNICAL LITERATURE

Filter

Bulletin 114 describes a tubular filter useful for any water or chemical purification task which builds up air pressure at the end of the filtering cycle and uses the pressure for a sudden back-surge to clean the filter. No extra devices are described as used, the filter shell itself acting as the pressure chamber and the arrangement of regular valving providing the controls. *Industrial Filter and Pump Mfg. Co.*

For free copy circle No. 10 on postcard, p. 121

Buffs

An illustrated 12-page bulletin covering a line of buffs is now offered. The bulletin describes and displays the three different types of buffs used in cutting down and coloring; pieced buffs, used for lighter work; full-disc buffs, for medium to light duty; and Ruff-L-Buffs, for heavy duty. The advantages of Binderized buffs are shown in close-up photos. Such pertinent information as grades of cloth, ruffle patterns, diameter sizes, hole sizes and flange designs is given in detail. *Hanson-Van Winkle-Munning Co.*

For free copy circle No. 11 on postcard, p. 121

Rotary tablet machines

Two new rotary tablet machines, Model 533, with a maximum operating pressure of 10 ton and Model 540, of 4 ton capacity, are described in a new 6-page bulletin. The bulletin illustrates and explains in detail a number of advanced design features of the new presses reportedly making for simplicity in setting up and adjusting their operation. Complete performance specifications and physical dimensions are given. *F. J. Stokes Machine Co.*

For free copy circle No. 12 on postcard, p. 121

Mark stick chart

Designed to aid the industrial marking user in his selection of the proper marking stick is a new selection chart. The publisher says the slide chart tells instantly which of the marking sticks it manufactures should be used on such varying applications as ferrous and nonferrous metals, plastics, lumber, glass, rubber and ceramics. *Markal Co.*

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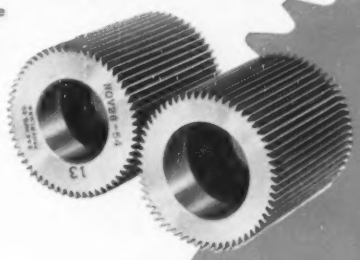
Money-Saving Slant on Special Cutters . . . from Brown & Sharpe

Matched pair of opposed profile-sharpened cutters engineered by Brown & Sharpe to finish-mill steel wire into high precision hosiery needle blanks at a single synchronized pass.



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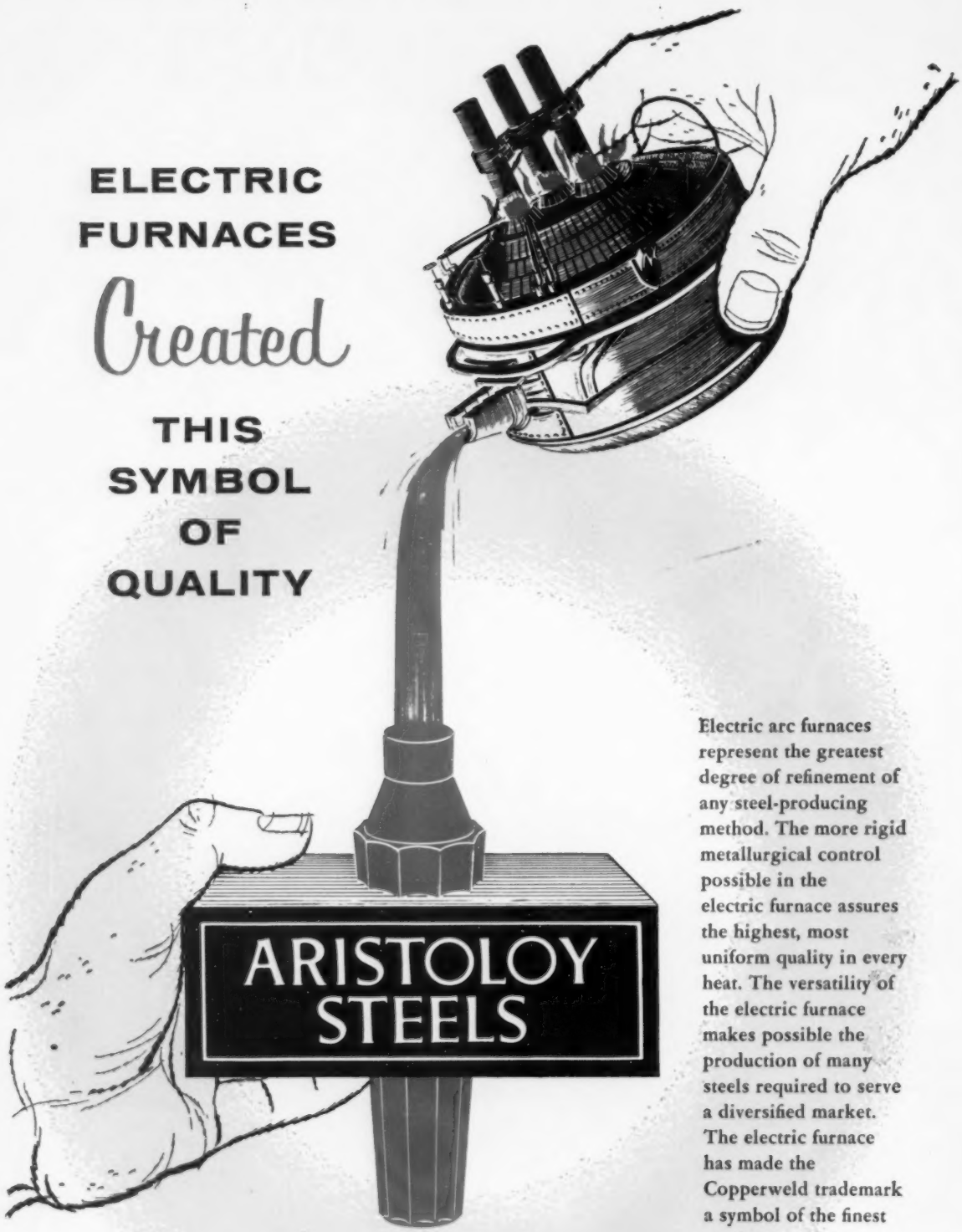

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FREE TECHNICAL LITERATURE

These publications describe money-saving equipment and services . . . they are free with no obligation . . . just circle the number and mail the postcard.

This section starts on p. 116

Bur selector

A wall chart, 18¼ in. x 27½ in, containing operating information and illustrations of more than 120 standard solid tungsten carbide burs is now available. One feature of this chart is the recommended speed table which describes the correct bur and rpm for most efficient work on any material from stainless steel to aluminum. A complete line of standard solid tungsten carbide burs is depicted at actual size with specifications and tool numbers to facilitate ordering. *Atrax Co.*

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Power unit

Literature and specification sheet is available on a new dual voltage range magnetic amplifier regulated dc power supply with a voltage output of 5 to 30 v and 10 to 40 v at 30 amp. This tubeless unit contains no moving parts and has a dual wide range output voltage in one compact container. *Write on company letterhead to Perkin Engineering Corp.*

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Embosser

Folder describes a machine for high speed embossing which can be combined with other data processing equipment. The unit, known as the Databosser, is described as providing fast type-setting of variable data and other functions which can be automatically actuated by punched cards or common language tapes. Additionally, type can be set at typewriting speeds by using a key punch or a tape perforator, while one thousand or more Dashaplates can be automatically embossed in one hour. *Dashew Business Machines, Inc.*

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Industrial trucks

A new 4-page folder which covers a complete line of industrial trucks is available. This new condensed illustrated circular gives a brief description of each of the 42 trucks and attachments it contains. Among products covered are: electric fork trucks (both rider and walkie types), electric tiering trucks, tractors, stackers, cranes, working height lifters, handlift trucks, floortrucks, trailers. *Lewis-Shepard Products, Inc.*

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Structural steel

Well illustrated brochure presents a group of buildings constructed of pre-engineered steel structures which are delivered and erected by the supplier as packaged units. Included in the brochure are their advantages, varied applications, and a list of customers for them. *Carew Steel Products Corp.*

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Grit

Bulletin 901-D describes Steeletts —developed for blast operations that require a grit. Reported advantages of long life, high hardness, super-etch action and cost are detailed. Included is discussion on typical applications. *Wheelabrator Corp.*

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Rebuilt machine tools

Catalog No. 203 describes and illustrates a complete line of rebuilt machine tools including drills, grinders, lathes, millers, planers, presses, shapers and others. The book contains 38 pages of information. *Miles Machinery Co.*

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Set screws

Catalog No. 19 describes the Setko jewel case of set screw ideas. The case contains over 30 of the latest set screw developments. Included are hopper-fed, self-tapping, and pivot-lok set screws; super-tork, pre-tork, jam-lok and jail-lok screws; several self-locking types with slotted or socket heads; and allied products such as pipe plugs and hexagon keys or wrenches. Brochure discusses each item and suggests applications. *Set Screw & Mfg. Co.*

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Lathe

A 32 in. heavy duty lathe is described in a new 20-page, 2-color bulletin that has just been issued. Twelve important features of the lathe are presented and illustrated in detail. This new bulletin also points out the various spindle speeds, which are in true geometric progression. Specifications are also included. *Axelson Mfg. Co.*

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Puller

Bulletin 146-G describes a new, improved CM Puller — a lightweight, portable device operated by a ratchet handle which is recommended for miscellaneous lifting and pulling jobs. The 6-page bulletin illustrates and describes the various models of the Puller which is available in capacities from ¾ to 6 ton. *Columbus McKinnon Chain Corp.*

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Aluminum

Up-to-date information on Kaiser aluminum mill products and services is contained in a new 24-page booklet now available. The brochure offers data on aluminum alloys, forms, mechanical and physical properties, applications, fabricating and finishing techniques and availability. Products include sheet, plate, foil, circles, pig, alloy ingot, rod, bar, wire, electrical conductor, forgings, extrusions, extrusion billets, roofing and siding and shade screening. *Kaiser Aluminum & Chemical Sales, Inc.*

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Wire drawing

A new, 8-page, 8½ in. x 11 in. booklet illustrates and describes a line of continuous tandem wire drawing machines. The types covered include the drum type, block type and combination type for drawing brass, copper, aluminum, and other non-ferrous metals. Tables of specifications for 10 and 12 die machines and a floor spooler are given. The booklet also lists other types of wire drawing and flattening equipment. *Waterbury Farrel Foundry & Machine Co.*

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Gear drives

A new line of in-line helical gear drives is described in a 16-page book (No. 2651), just published. Load classes for over 250 applications, overhung load ratings and dimension tables, instructions for proper selection and cutaway views of both double and triple reduction drives are given. *Link-Belt Co.*

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Fans

A new 72-page, illustrated, 2-color catalog (Bulletin 5306) describes a series of industrial fans designed to provide full-range coverage of industrial air and material handling requirements. The catalog describes the features of the new fans, discussing such important considerations as wheels and arrangements, optional construction, modifications and special design and construction details for high temperature operation. A special Elevated Temperature Application Guide offers recommendations for bearings, fan construction, fan arrangement and maximum speed factor in high temperature installations based on air or gas temperature. *American Blower Corp.*

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Automatic welders

Internal expanding and sizing automatic welding machines for circumferential and longitudinal welding are described in a new folder. Included also is data on a weld planishing roll. *Airline Welding and Engineering.*

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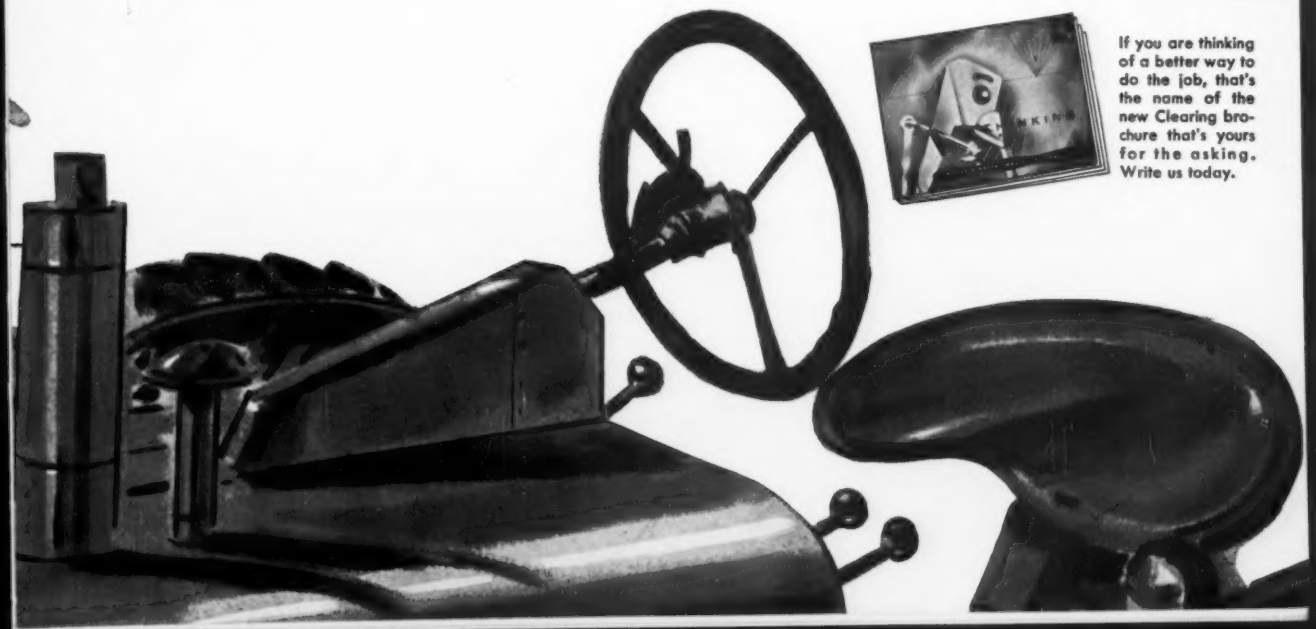

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The ever increasing demand for Kendex tooling is indicative of the wide application of the Kendex principle to all types of machines: turret lathes, engine lathes, planers, milling machines, and automatic cycling machines. To meet this growing demand, Kennametal† has more than doubled the number of sizes of Kendex toolholders, and now offers a complete line of inserts for all holders and job requirements. This expanded line now includes:

- **17 Kendex holder styles and 101 different tool sizes in a rugged, simple, trouble-free design . . . proven on a broad range of applications**
- **a wide selection of standard nose radii (non-standard radii also available at slight added cost)**
- **a complete line of Kennametal inserts for all job requirements . . . to fit all tool holders now in use**

Thus, Kennametal now offers the exact style of Kendex tooling you need . . . positive or negative rake holders: square, triangular, round or heavy duty inserts with correct nose radii for use with your present holders. Regular inserts (ground top and bottom only) and precision inserts (all surfaces ground) are stocked in a broad range of grades.

Why not discuss your tooling problems with a Kennametal tool engineer and let him show you how Kennametal tooling can provide the right answer on any machining job. Or write to KENNAMETAL INC., Latrobe, Pennsylvania.

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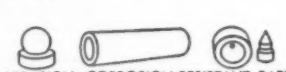

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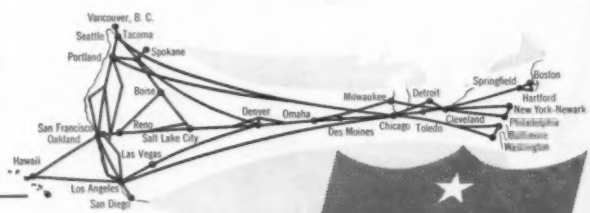

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FABRICATING: Auto Frames Bettered

Car units described as 50 pct more resistant to torsion and twisting of rough driving are produced . . . Tube mill and bending machine facilities get credit.

Methods for producing a sturdier automotive frame, as disclosed at the Chevrolet Motor Division's new stamping and frame plant near Flint, Mich., are described by T. H. Keating, general manager of the company, as not only achieving greater efficiency than conventional production but turning out newly designed frames that have proved 50 pct more resistant to the torsion, or twisting, caused by rough driving.

The most radical advance occurs in the formation of the frame side members which run lengthwise under the car, supporting the body and other key components. Two operations — one employing a tube mill which spews out 150 feet of steel tubing a minute and the other a series of ingenious bending machines— have been introduced into mass production of frames for the first time.

Tube Mill Cuts Handling

The tube mill eliminates handling, stamping and slower welding methods required in conventional production.

Welding in the tube mill operation is the same high speed welding process used in the manufacture of tubes for propeller shafts and other commercial uses. The process not only achieves greater rigidity in the frame, producing a weld that tests have shown to be the strongest part of the girder, but also lops off up to 4½ lb. added by the overlap between the two channels in the old method.

Though the tube mill is largely responsible for the plant's high-volume output, Chevrolet engineers point out that the key to the operation is the bending machines which give the girders the contours required by the frame design. The engineers explain that the tube mill process — a familiar method of producing straight tubing—could not have been adopted without the unique bending operation.

WANT MORE DATA?

You may secure additional information on any item briefed in this section by using the reply card on page 121. Just indicate the page on which it appears. Be sure to note exactly the information wanted.

Bending machines form curves in auto frame side members.

The big problem in the process, according to the company, was to provide the means of altering the shape of the tubing without causing it to buckle or collapse. This was solved with devices called articulated mandrels, basically lengths of jointed metal which are inserted into the hollow girders under hydraulic pressure. The mandrels back up the sides of the unheated girders while the cold bending and reshaping takes place.

An idea of the complex action

of some of these mandrels can be obtained from a pre-form operation which changes the nearly square perimeter of one end of the girder to an elongated rectangle. Parts of the mandrel are arranged to form a kind of clothespin inside the girder. Another wedgelike part is then driven into the clothespin slot to give the front end of the girder —the part which carries the car engine—its extra strong elongated shape.

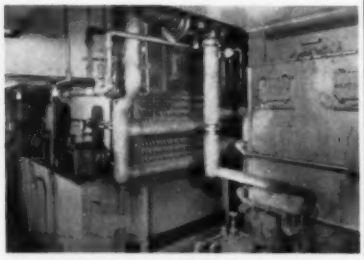
In the subsequent operations, five bends are put into the girder, sometimes one bend superimposed on another. One intricate snakelike mandrel has a total of 70 details, or jointed parts.

Foundry:

Humidity control aids malleable production

By adding humidity control to the process the Crane Co. has refined cupola melting of iron in its new malleable iron foundry at Chicago.

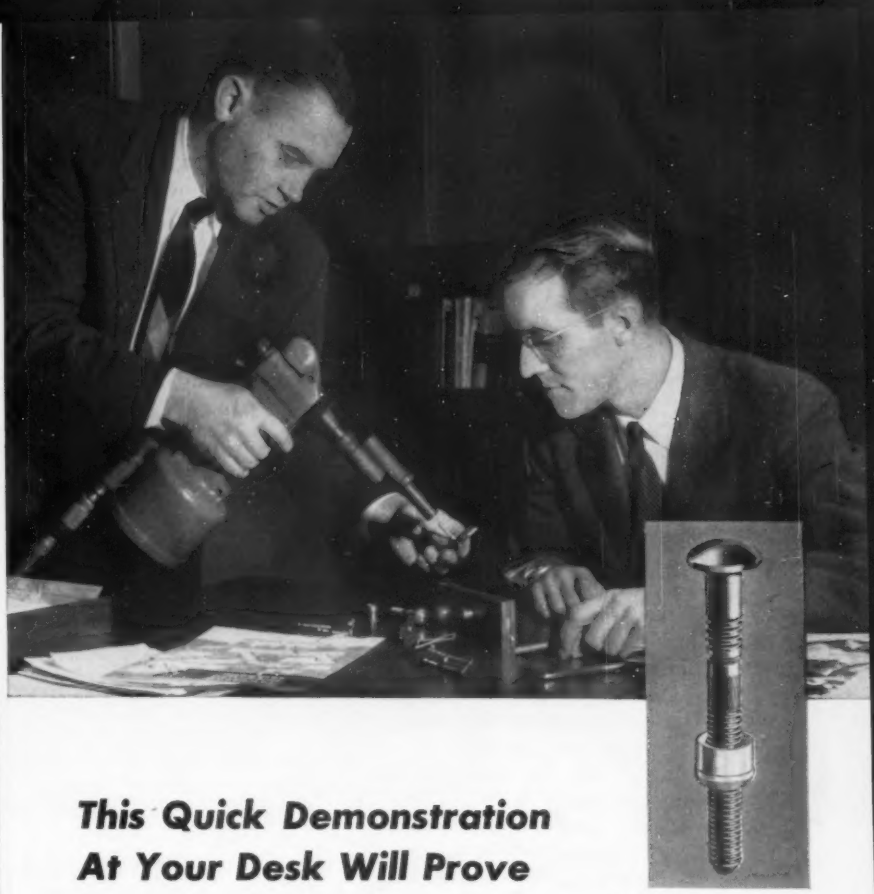
The result, achieved with a Kathabar chemical type humidity conditioner, has been savings in



Humidity control includes regenerator and air washer.

coke consumption, improved carbon control, more uniformity in the chilling propensity or mottling tendency of the iron, reduction of shrinking of iron and of cracking of the castings. Castings also are more readily annealed.

The Kathabar unit, made by Surface Combustion Corporation of Toledo, Ohio, reduces 14,000 cfm of air from maximum design conditions of 10 gr/cu ft of moisture to 3 gr/cu ft before it enters the hot blast unit.



This Quick Demonstration At Your Desk Will Prove

How To Get Better, Economical Fastening With Townsend Lockbolts

A few minutes of your time invested in watching a simple demonstration of a better fastening method may point the way to savings of thousands of dollars in assembly of your products. The Townsend lockbolt provides a quick method of producing tight, rigid fastenings that cannot loosen even under extreme vibration or shock conditions.

We would like to have a Townsend engineer demonstrate to you and others in your organization how these lockbolts combine the advantages of riveting and bolting—eliminate the disadvantages. He will show you that installation is fast—that fewer workers can complete an assembly in less time—you improve your product—achieve a lower installed cost.

You will be able to see why the clamping action, or clinch, of Townsend lockbolts is higher than rivets—is more uniform than bolts and nuts. The demonstration will explain how the lockbolt fills the hole better than other fasteners—makes possible a more rigid joint and provides an effective liquid seal.

Townsend lockbolts are available in steel and aluminum alloy, in 3/16", 1/4", 5/16" and 3/8" diameters, in grip length ranging up to 2", in various head styles.

For a demonstration on how to speed production, get tight, secure, permanent fastening with Townsend lockbolts write on your company letterhead to Townsend Company, P.O. Box 237-B, New Brighton, Pa.

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Hardsurfacing:

Shipyard finds metallizing saves time and money

Workers at the Alabama Drydock and Shipbuilding Co., Mobile, state that from long experience in marine repair and building work, the metallizing process adopted by their company in 1944, has been a worthwhile time and money saver.

Prior to installing metallizing equipment, many parts were scrapped and new ones made or purchased. Quite often electric or acetylene welding was used. In this case the choice of metals was limited and often shrink or warping tended to weaken the shaft. One of the main reasons for turning to metal spraying was the attractive idea of build-up with almost cold metal. A sprayed coating usually does not exceed 350°F which is not sufficient to affect the base material.

Spray technique allows build-up with almost cold metals.

Applications Listed

Such spray guns are used in the maintenance of equipment for steel fabricating, sheet metal and lumber processing, electrical apparatus, foundry equipment, gantry cranes, locomotive and floating derricks. Also they are used on six big drydocks for elevating all types of vessels to a dry position for underwater repair work.

Built Up 40 ft. Shafts

Examples of work done have ranged from ¼ in. fan motor shafts on up the line to stern tube bushings that run as high as 36 in. diameter. The firm built up some 40 ft tailshafts for a British corvette which was being converted to destroyer use. Three sections of the shafts had to be brought to greater dimensions in order to fit new liners to them. Metal spraying did the job in this instance.

Corrosion:

Deionization system reduces scaling in humidifiers.

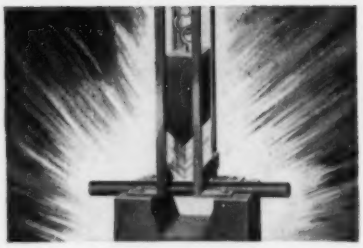
Untreated water often is a source of continuing maintenance difficulty in humidifying systems. In many areas of the country, water may look perfectly clear, yet contain dissolved solids which, because of the large makeup and high evaporation rate, rapidly produce scale in the equipment.

Behr-Manning Div., Troy, N. Y., solved this troublesome problem by adopting a deionization system which removes all dissolved solids from the water before it reaches the humidifiers. The company has two types of humidifying systems. These are used in connection with ovens for curing coated abrasive materials under rigidly controlled time, temperature and humidity conditions.

Makeup Water Conditioned

Twenty-seven air-washer and pan-type evaporators are used, requiring a total makeup of 67 gpm under present operating conditions. Scaling was particularly acute with the air-washers, which are often used on an intermittent basis as required by production schedules. Here it deposited on spray nozzles. In pan-type washers, it built up on heat exchanger tubes in a thick scale.

Deionization was found to be the solution. All makeup water is now conditioned to practically zero dissolved solids in Monobed deionization units designed and installed by Hungerford & Terry Inc., Clayton, N. J. Three pairs of units, rather than a single large unit, were installed because of scattered locations of the 27 humidifiers.



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Fulton Foundry & Machine Co., Inc., Cleveland, Ohio
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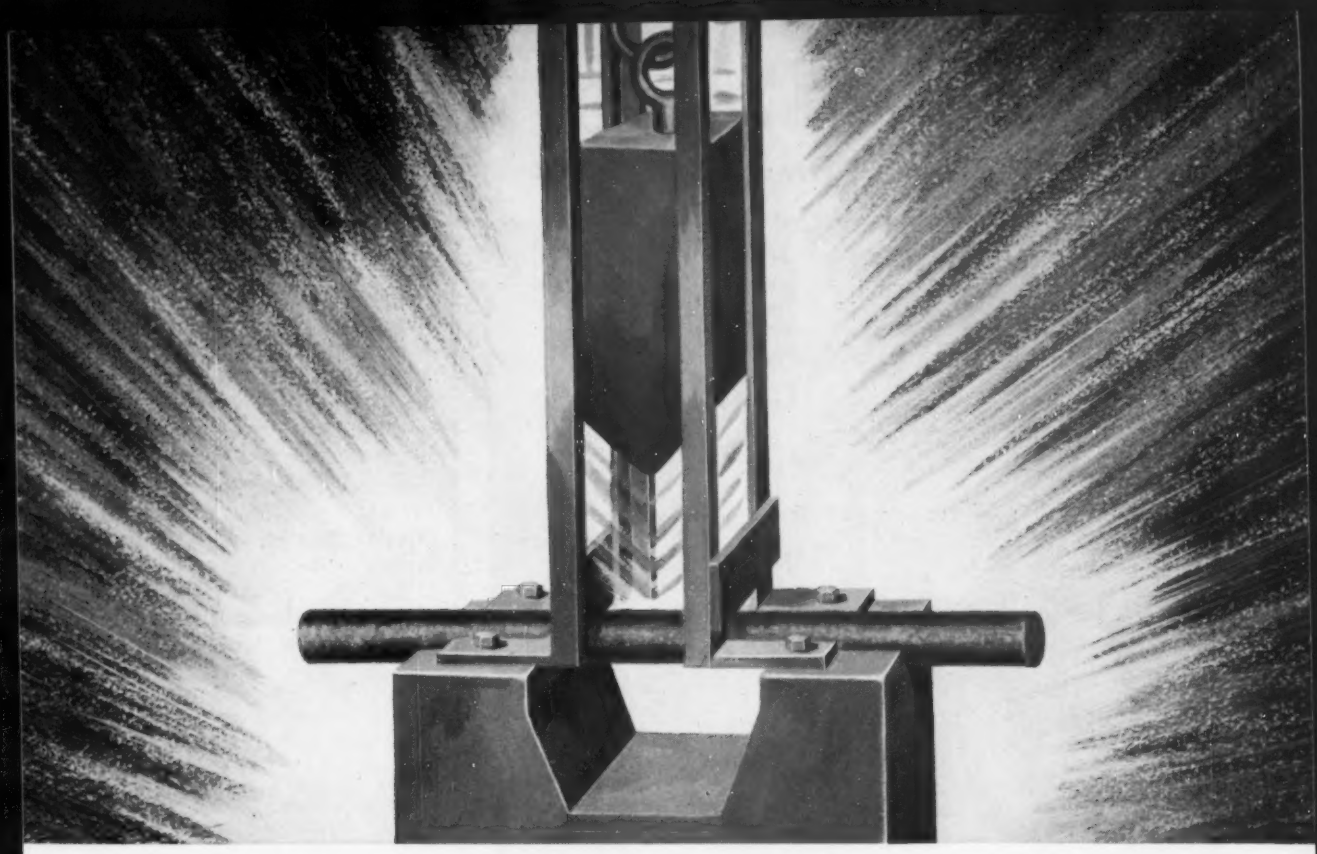
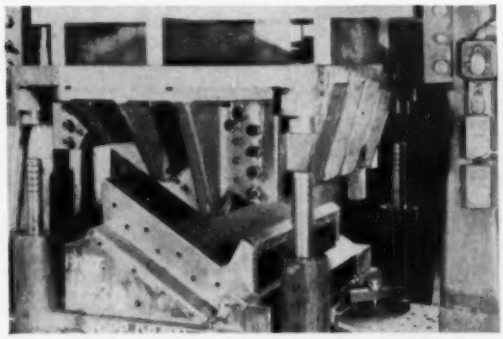


EXCELLENT SHOCK-RESISTING PROPERTIES OF MEEHANITE CASTINGS OFFER PROOF OF HIGH STRENGTH AND TOUGHNESS

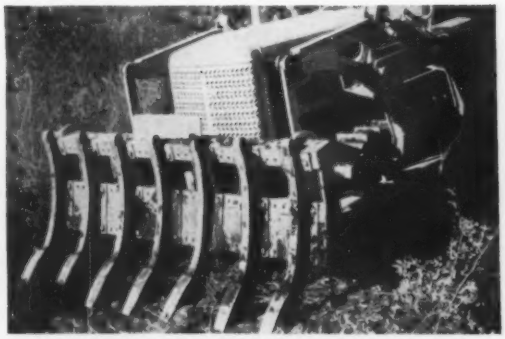
PERMANENT DISTORTION				
Impact Foot Pounds	Mild Steel: Deflection	Cast Steel: Deflection	Type GA Meehanite, As Cast: Deflection	Type GAH Meehanite, Heat-Treated: Deflection
10	0	0	.001	0
12½	.005	.005	.004	0
15	.007	.007	.008	0
17½	.024	.027	.013	0
20	.037	.047	.019	.002
22½	.048	.064	.027	.005
25	.071	.089	.033	.006
27½	.098	.110	.042	.007

These drop test results provide a measure of the impact strength of Meehanite. Test bars (1" dia. x 8" long) were subjected to a series of blows from different heights.

Structurally controlled Meehanite Metal Castings are available in 26 different property combinations to meet exacting engineering requirements. When superior shock-resistant qualities combined with strength and wear resistance are demanded, Meehanite Metal control provides designers and engineers with assurance of casting uniformity and dependable job performance. *For more information, send for your copy of the "Handbook of Meehanite Metals."*



Meehanite Forming Dies give longer service life and freedom from scuffing and galling.



Meehanite Metal Tooth Caps for heavy-duty land clearing rakes provide long wear life without failure under severe impact conditions.

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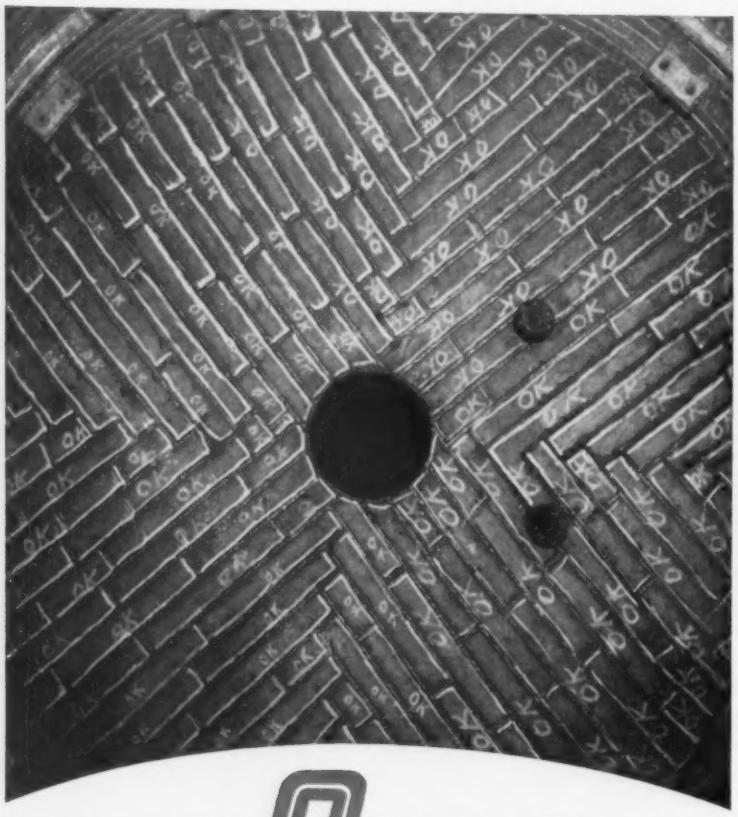


WELD WITH ARCOS

STAINLESS ELECTRODES

On weld after weld—such as in this refinery tower lining which must resist intense corrosion—Arcos quality controlled electrodes will give you the "right" weld metal . . . easily deposited. If you are looking for sound, low cost, long-life welds—you can rely on Arcos *ELECTROPAKED* Electrodes to produce unquestioned "OK's" time after time. ARCOS CORPORATION, 1500 South 50th Street, Philadelphia 43, Pa.

Research:

Electronic "stop watch" for minute timing.

Scientists at the Westinghouse Research Laboratories report they have developed the world's fastest stop watch—an electronic tube which can time atomic events down to less than one billionth of a second.

Actually, the scientists report, the exact top speed of their new stop watch must await the development of better laboratory techniques to measure it experimentally. But the tube has been timed down to the billionth of a second figure, and calculations show it is probably 10 times faster than this.

For Nuclear Work

Described as a new and improved type of photomultiplier tube it will be used for fundamental research in nuclear physics, where it will be used to time with great exactness the flight of speeding atomic particles Such photomultiplier tubes strengthen radiations by a sort of "chain reaction" of electrons. The new tube employs a new principle of operation to obtain this electronic "chain reaction." An electron, released by a pulse of radiation entering the tube, strikes the front surface of an exceedingly thin non-metallic film and knocks several additional bonus electrons from its back surface. An electric field speeds up these new electrons and aims them at a second film, where each one releases more electrons from that film. This increase of electrons continues through several steps, or stages. The result is that several million electrons are obtained for each one released in the beginning. In this way the tube gets its multiplying effect.

Speed Electron Flow

Conventional photomultiplier tubes, the company spokesman declared, use thick metal plates instead of thin films to obtain the bonus electrons. In such tubes

the electrons must be guided through a number of complicated paths in going through the tube. However, in the new tube, the avalanche of bonus electrons always moves straight ahead. This shortens the paths of the electrons, speeds their travel time through the tube and prevents the "straggling" of electrons from stage to stage.

Machining:

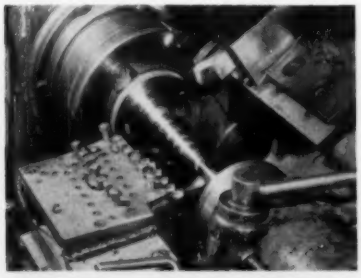
Carbide cutter reduces tool costs, speeds production.

Tool costs dropped from 9 to 2 cents per piece and production rate was nearly doubled in an eastern gear manufacturing plant as the result of a switch to a Wessonmetal "26" carbide.

The operation consists of facing and rough turning alloy steel stem gears (32 Rc) on a 20-in. automatic lathe. Eight Wesson brazed-type flat tools and one multicut insert holder are used in the multiple tool setup. A single carbide, Wessonmetal "26," is used on all the tools.

Tool Life Improved

Formerly the job was done at 525 rpm and 270 sfpm. After the change to Grade "26" tool engineers recommended a boost in the production rate to 580 rpm and 305 sfpm. Even with the increased production rate, tool life has shown a marked improvement.



Machining gears on lathe with multiple tool setup.

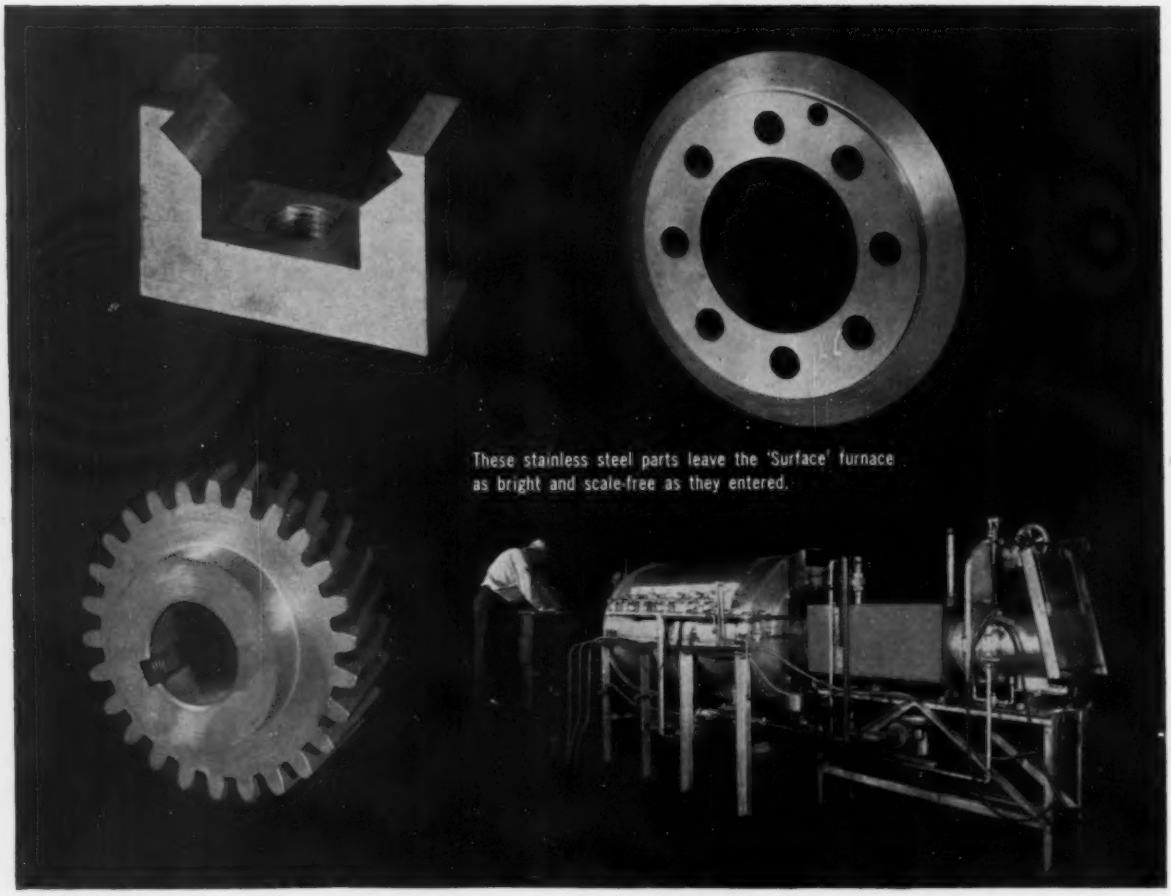
Depth of cut now averages 3/16 in., resulting in a 25 pct reduction in machining time from 2 minutes

A sure way to meet every demand when welding high strength steels

WELD WITH ARCOS

LOW HYDROGEN ELECTRODES

Low hydrogen electrodes are no "stepchild" at Arcos. They're manufactured under the same high standards as stainless—to meet exacting conditions. For example, welds in a dipper that will chew out 45 cu. yds. of stony soil in one bite must be strong, and must resist abrasion, shock and fatigue. Where strength is of primary importance, Arcos ELECTROPAKED Low Hydrogen Electrodes, frequently without preheat, are the "sure way" to get quality weld metal .... easily deposited every time. ARCOS CORPORATION, 1500 South 50th Street, Philadelphia 43, Pa.



bright hardened stainless sells!

you can really sell bright hardened stainless and other high alloy steels, because they save money for your customers.

this has been demonstrated by the people at Syracuse Heat Treat Co., Syracuse, N. Y. In the two years since they installed this 'Surface' high temperature muffle furnace, they have sold their customers savings—cost cut $1.87 on one part . . . hand stoning operation cut from 30 to 5 minutes on another . . . delivery in half the previous time . . . tighter specifications met.

and you earn yourself, as the Syracuse people found out, because the furnace delivers parts clean and bright, and eliminates costly, time-consuming descaling operations. The market is good for the premium product this furnace permits. Why not tap it now?

write for the story on bright hardening stainless

Surface
HEAT TREATING EQUIPMENT

SURFACE COMBUSTION CORPORATION, TOLEDO 1, OHIO
also makers of Janitrol automatic space heating and Kathabar humidity conditioning units

formerly to 1½ minutes per piece with the present tooling. This stepped up rate plus lower down time for tool change due to longer tool life has nearly doubled hourly production to 50 per hour compared with 30 formerly.

There were four sources of savings on this job: (1) the large increase in number of grinds possible per tip (9 to 10 vs. 4 formerly) due to reduced edge wear and breakage; (2) more than double the number of pieces before regrinding was required; (3) fewer tool changes required; and (4) higher output per hour due to increased feed and speed.

Plating:

New process developed for cadmium deposition.

A new Cadalume process for bright cadmium plating in still tanks, announced by Hanson-Van Winkle-Munning Co., Matawan, N. J., introduces a simple to operate, low-cost bath for producing bright, uniform, eye-appealing cadmium deposits.

Cadalume reportedly makes bright dips unnecessary, although it will take conversion coatings. The Cadalume brightener may be added directly to the bath. No break-in period is said to be needed; the desired deposit brightness appears immediately in a balanced bath.

Used for Protection

The process is used to protect iron and steel parts against corrosion, and non-ferrous metals against surface tarnish, corrosion or galvanic couples formed in assemblies.

Although the Cadalume deposit has exceptional brightness as deposited, on deeply recessed work, a 1 pct nitric acid bright dip may be used to brighten low current density areas.

Clear Solution Aids

The Cadalume bath is a clear solution, which assists in arranging work in the tank. Unlined steel

"USS GERRARD STEEL STRAPPING and the Model TA Machine

...save us considerable time and money," says A. G. Spalding & Bros., Los Angeles, Calif.

"and provide a secure, pilferproof package every time."

This famous sporting goods manufacturer has been using USS GERRARD Steel Strapping for over six years to wrap shipments destined for all corners of the earth. They have found the GERRARD TA Machine to be speedy, simple, and easy to operate. And the packages, once tied with GERRARD Round Steel Strapping, remain tightly wrapped, rigid, and snug until they reach their destination.

The Spalding Distributing Branch secures with GERRARD Steel Strapping all packages which weigh 75 pounds or less, and are to be shipped great distances. Formerly, string, cord or twine were used to reinforce the packages—hand-wrapped with several loops. The GERRARD Steel Strapping now in use has proved to be cheaper, 3 to 4 times faster, and tremendously stronger.

If you haven't investigated GERRARD Steel Strapping—Round or Flat—you should. And do it now. If you'd like help with your packaging-tying problem, our engineers would be happy to help you find the safest, most economical solution to it. Get in touch with us.

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36 pages of photographs, descriptions, facts and figures on all USS GERRARD Steel Strapping and associated equipment.

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General Offices: Chicago, Illinois

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Round and Flat
UNITED STATES STEEL

Whatever your gear requirements may call for with respect to size, type of basic material, accuracy, quantity, delivery schedules . . . a call at Perkins today can bring you many more practical reasons why, for precision custom-made gears, it's a good idea, and good economy too to CALL PERKINS FIRST for quotations!

PERKINS MAKES : bevel gears, ratchets, sprockets, ground thread worms, spiral gears, helical gears, spur gears with shaved or ground teeth.

NOTE: The **PERKINS PRECISION SPRING COILER** is the latest development in the spring coiler field and eliminates entirely the use of arbors and long set-up time. It is a complete self-sufficient machine and enables you to make the spring you want when you want it — in seconds. The coiler produces any type of spring, in any diameter and any pitch with this range: Wire sizes .005 to .125. Diameter, from 3/32" to 12" and larger. Size of the compact coiler is only 7½x16". A POWER MODEL is available. Information on request.

Perkins Machine & Gear Company
103 Circuit Avenue, WEST SPRINGFIELD, MASS.

tanks have proved satisfactory for cadmium solutions. Rubber lined steel tanks can also be used, as current can be directed to the work with greater certainty of even metal distribution.

Steel or copper racks may be used, provided they are insulated to conserve metal and current, and to prevent contamination of the solution.

Painting:

High heat paint provides protection up to 750°F.

A new, low-cost, black high heat paint is reputed to offer maximum protection for surfaces subjected to temperatures up to 750°F.

Known as HSE (hot surface elastic) black, it is composed of a black pitch base bolstered with a special silicone additive. This

High heat paint is pitch base with silicone additive.

combination is said to form a heavy-bodied coating that does not blister or become brittle even when subjected to varied temperatures, smoke, fumes, mild industrial acids, alkalis and moisture.

According to the manufacturer, HSE air dries to a smooth finish in 8 to 10 hours and does not require special baking to be com-

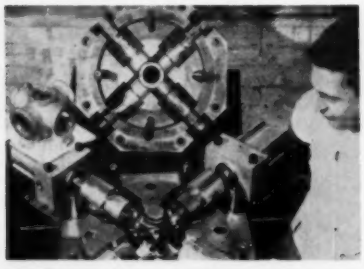
pletely effective. As a result, it can be used as needed without interrupting regular schedules.

Recommended uses for HSE include the protection of heat lines, radiators, condensors, compressors, turbines, boilers, stacks, tanks, ovens, furnaces, steam lines, vats, separators and exhaust manifolds.

Die Casting:

Aluminum, zinc and bronze castings combined

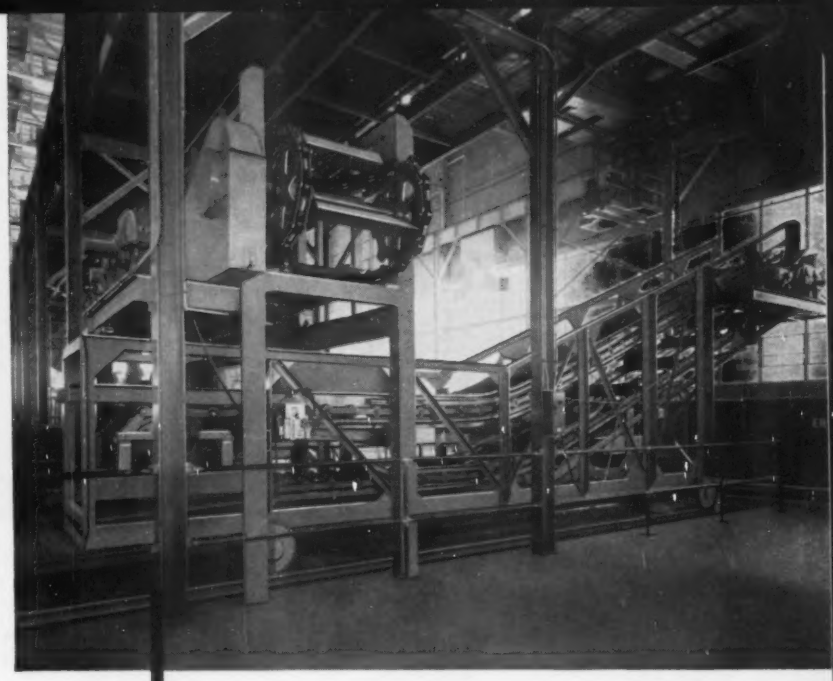
Incorporating aluminum, zinc and bronze die castings, a new gasoline meter has been developed which is reported to show no measurable wear and to eliminate traps for contaminating impurities. Representing many years of research and testing, the PM-2 gasoline pump meter is a development of the Los Angeles Branch of A. O. Smith Corporation. Credit for the successful use of die castings in the design is given a local job shop die caster, a member of the American Die Casting Institute, who worked very closely with Smith's engineering department in the development stages.



Eight moving side cores are incorporated in housing die.

One-piece Aluminum Housing

The meter housing is die cast in aluminum as one piece to cut assembly costs and eliminate possible leakage points. To produce this accurately-dimensioned, intricately-shaped one-piece housing for the PM-2, the die was designed to incorporate eight moving side cores. Four circular cores are actuated by hydraulic side pulls and the other four cores, which comprise the sides of the unit, are



Saves $22,000 a year

Planet Pusher-Bar Conveyor Pays for Itself in Eleven Months

At a leading automobile plant, loading scrap from trim presses on to railroad cars formerly required a two-man crane and magnet operation.

Now . . . two Planet conveyors move baled scrap to waiting railroad cars *automatically* . . . saving $22,000 a year!

The system, which now loads an average of 12 cars a day, is engineered to handle a maximum of 105 cars a day. The retractable conveyor permits easy movement of the railroad cars.

If your plant has a scrap handling problem, get in touch with a Planet Engineer. Whatever your plant layout, he'll show you an efficient, compact, and economical way to minimize your handling costs.

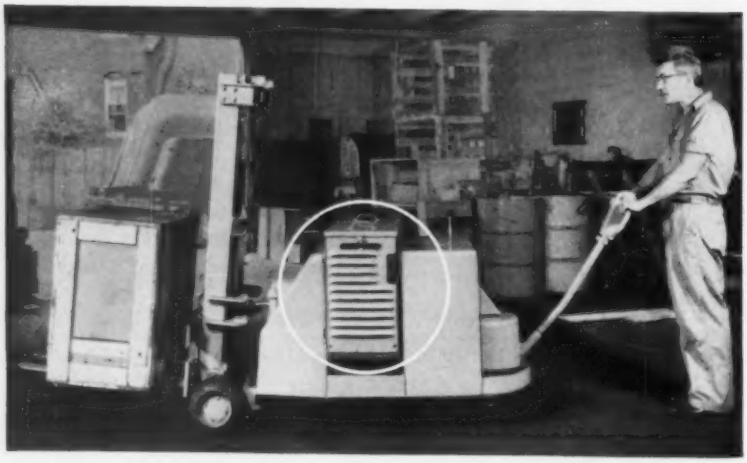
PLANET CORPORATION

1825 SUNSET AVENUE
LANSING, MICHIGAN

- CONVEYORS
- ENGINEERED SYSTEMS
- FOUNDRY EQUIPMENT
- AUTOMATION
- STEEL FABRICATION

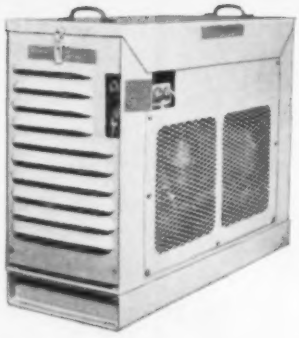
The Most Versatile Power Unit Ever Developed For Small Trucks

READY-POWER BANTAM MODEL W



Only the compact new Bantam Model W provides smooth, dependable gas-electric power that can be quickly interchanged from truck to truck.

A new high-performance unit features 12-volt automotive-type starting and ignition system plus complete choice of idling speed. Full access to engine and generator simplifies adjustment, even on the truck. Fits practically all makes of walkie and rider trucks up to 2000 lbs. *Write today for full information.*



READY-POWER

The READY-POWER Co., 3822 GRAND RIVER AVE., DETROIT 8, MICH.

Manufacturers of Gas and Diesel Engine-Driven Generators and Air Conditioning Units; Gas and Diesel-Electric Power Units for Industrial Trucks

motivated by angle pulls. The entire ejector side of the die is made up of side cores, which are pulled away from the casting when the die is opened.

Six major openings—one on each of four sides for piston cylinders, and one on top and bottom—are all formed by the cores in the die. Holes for mounting components and securing covers are also cored. Boring of the cylinder holes, some finishing of the base and tapping of the other cored holes are the only machining required on the housing. The housing functions under a normal operating pressure of 125 psi.

Mounted directly on top of the housing is a gear assembly, whose compact housing is also die cast aluminum, as are the meter's spider and two yokes. To take advantage of aluminum's light weight and increase its durability, two hard rolled stainless steel facings are cast-in as inserts into each yoke to form bearing surfaces.

Close Tolerance Zinc Castings

Close tolerance zinc die castings form six parts for the meter, four identical pistons and two gears. The four pistons are die cast with close tolerance outside diameter so that no machining is required other than the tapping of three holes. The four pistons fit snugly in the cylinder and run in a stainless steel liner, special leather cup packings providing the seal. The die cast pistons resist corrosive effects of the gasoline and its additives. The two die cast gears drive the indicating counters. Cast into place in the gears are oilite bronze bushings.

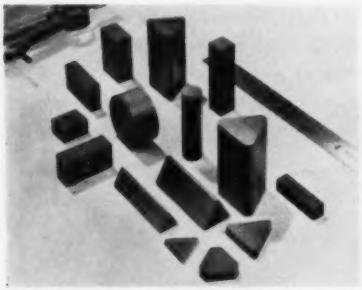
Manganese Bronze Used in Valve

Manganese bronze was specified for the meter's valve because of its high abrasion resistance. Since the valve is self-lapping, it maintains itself in top working condition despite many hours of operation. The ability of die casting to form thin-walled, close tolerance, intricate shapes, eliminates expensive machining.

Cutting:

Oxide-base cutter reported faster, longer lasting.

Tests with a new type of oxide-base cutting tool material which has been developed by the Stupakoff Division of The Carborundum Company are reported to show that it cuts at up to ten times the speed and four times the length of cut before excessive edge wear. The manufacturer has completed field tests and began making shipments in commercial quantities as of January 1, 1956. Previously these ceramic cutting tools have been available only in test quantities. The product, Stupalox, is designed to cut cast steel, cast iron, chilled iron, carbon steel, high-speed steel and non-ferrous materials.



Greater cutting speed, longer wear claimed for this cutter.

Test Results Given

Demonstration tests indicate the performance range of Stupalox as follows: In machining high speed steel (207-B annealed) with hardened high speed steel tools, cutting speed was from 80 to 100 sfpm. Stupalox provided a cutting speed of 505 sfpm with 0.023 in. feed and 0.125 in. depth of cut. Here the limit with the material was the cutting speed of the machine.

Cutting SAE 1035 steel with tungsten carbide tools gave a speed of 250 to 350 sfpm. Stupalox produced 1175 sfpm. In this test feed was varied from 0.015 to 0.005 and the depth of cut from 0.005 to 0.250 to demonstrate the tool's versatility.

Nimonic 80-A previously was

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private eye

We put the eye on your castings to cut heat-treat costs

Thermalloy castings such as pots and muffles are *completely X-rayed* throughout; other castings are X-rayed where experience has shown that abnormal conditions can be expected. All tests are conducted by trained radiographers.

X-ray testing is just one phase of Electro-Alloys research and quality control. Our Elyria plant has a completely equipped metallurgical laboratory for study of heat and abrasion problems encountered by our field engineers.

Let us put our facilities to work to solve your heat-treat problems. Call your local Electro-Alloys representative, or write for a copy of booklet T-225, *Thermalloy Heat-Resistant Castings Give Longer Service Life.* Electro-Alloys Division, 7006 Taylor Street, Elyria, Ohio.

*Reg. U. S. Pat. Off.—designating not just one but a *group* of alloys, each developed to meet a specific heat and abrasion problem.

Heat-Resistant Castings · Trays · Muffles · Retorts · Conveyor Belts · Radiant Tubes

AMERICAN Brake Shoe COMPANY

ELECTRO-ALLOYS DIVISION
Elyria, Ohio

OUR ERIE STRAYER BUCKETS WORK LONG HOURS, NEED LITTLE SERVICE

Reports Max Dozoretz, Partner, Lancaster Iron and Metal Co.

Clamshell buckets are put to many tough jobs. Probably the toughest is handling scrap metal. The constant brush of steel against steel lays up the ordinary bucket for frequent repairs and soon wears it out.

But not an Erie Strayer bucket! Mr. Dozoretz knows Erie Buckets. He has two of them on the job constantly. He says, "We work our Erie buckets hard—eight to ten hours a day, six days a week. We know they'll deliver full payloads with every pass.

"And we lose no time for maintenance! Our first Erie bucket has been in service, continuously, for six years now and is still going strong."

Compare the Erie with any other clamshell. You'll quickly note its finer engineering and the rugged construction that has made it the bucket preferred by experienced operators everywhere.

These Erie Features Mean More Days of More Work

1. Top closing power from block and tackle, plus lever arm construction, plus precision balancing.
2. Manganese steel teeth and high carbon steel lips that bite up full payloads of even toughest clay and gumbo.
3. Rigid, one-piece, welded head that shrugs off bumps and jars. No shimmy. No wobble.
4. Two-line, continuous reeving. Adds up to 50% to cable life. Less down-time for reeving.
5. Low head room for fast work in tight quarters; low center of gravity for easy positioning.

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BUCKETS THE WORLD OVER

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ERIE STRAYER CO.

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classed unmachinable. Best results obtained before were 80 sfpm, 0.005 feed, 0.005 depth of cut. Tool sharpening was necessary every ¼ in. of linear cut. With Stupalox the speed was reduced to 40 sfpm, the feed kept at 0.005 and depth of cut increased to 0.100 or 20 times the depth of previous cut.

Rolling:

Mills turn out strip aluminum, copper alloys.

Two new high speed rolling mills are helping American Brass Company at its Torrington, Conn. plant to keep pace with the demand for strip aluminum and copper-base alloys. The rolling mills are 10 in. and 29 in. x 36 in. four-high reversing cold mills designed and built by the Lewis Machinery Division of Blaw-Knox Co., Pittsburgh.

One of two units for cold reducing of strip.

Rolling strip at speeds ranging from 400 to 1200 fpm, the mills can cold reduce aluminum alloys with a maximum starting thickness of 0.125-in. down to a final finished thickness of 0.010-in. with intermediate anneals if necessary. Finished diameter of the coils is 20 in. ID and 49 in. max OD, 14 in. to 32½ in. wide. Each coil of strip metal weighs about 4800 lb.

Convenient Controls

Each mill is driven by a 600 hp main drive motor. One mill has one 75 hp motor and one 150 hp motor mounted in tandem with an interposing clutch driving each reel. The dual motors on the winders give the operator greater sensitivity in controlling the ten-

sion on the strip going through the mill. The other mill has a single 250 hp motor on each reel.

Controls for the mill and for the auxiliary equipment are located for the greatest possible convenience to the operator. The operator's cabinet swivels for good visibility and accessibility. Directly beside the operator are petcock controls for the spray nozzles; also controls for the auxiliary equipment, the reels, pinch rolls, side guard adjustments.

Casting:

New engine block design advantages cited.

A new way to manufacture automobile engine blocks is reported by the Perfect Circle Corp., Hagerstown, Ind. The new block design, company spokesmen say, would eliminate or drastically reduce the baked sand coring now used in engine block construction.

In the Perfect Circle design, the engine cylinders and top deck are not included in the casting of the block, but are a separate assembly.

Centrifugally Cast

The centrifugally cast iron cylinders are silver brazed to a steel top deck. The unit is sealed to the block by a paper neoprene gasket and the lower ends of the cylinders are sealed by rubber rings where they pass into the crankcase.

Many manufacturing advantages were cited including: larger cylinder diameters possible on given cylinder center distances; softer iron can be used in the block proper, which will permit up to 25 pct more blocks to be machined on a given set of machine tools; better material can be used in the cylinders; cylinder wall thickness is uniform and precisely controlled; engine block scrap from water leaks and other defects is reduced; and cylinders, in an engine of this design, are not subject to structural stresses.

Replacement Simplified

With this design, officials state, it is possible to readily build engines of a considerable range of

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CASTINGS
pay off!
CENTRIFUGALLY CAST FOR PRESSURE SERVICE. This large sluice gate operating cylinder, assembled by precise shrink fit as shown here, will safely handle pressures up to 250 psi. The Meehanite Metal cylinder housing, sleeved with a bronze liner 20" in diameter . . . are both centrifugally cast by Shenango for increased tensile strength and improved resistance to wear, stress and abrasion. For complete information on rough finished, semi-machined or precision-machined parts, ferrous or non-ferrous, write to: Shenango-Penn Mold Company, Centrifugal Castings Division, Dover, Ohio.
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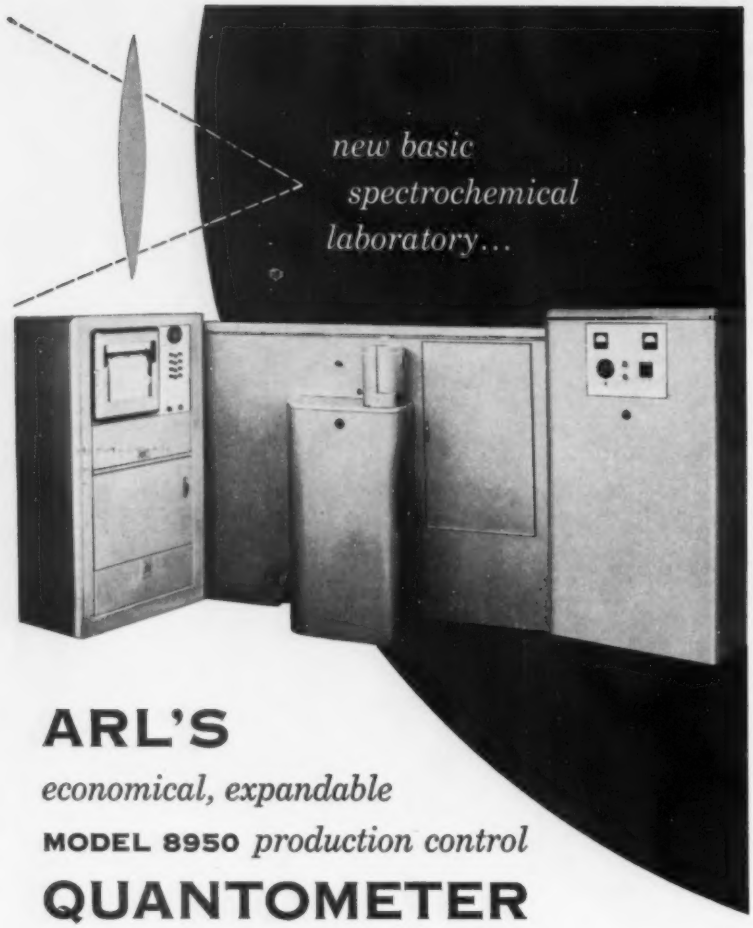

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economical, expandable

MODEL 8950 *production control*

QUANTOMETER

More and more modern industries are finding a definite need for regular – but limited – spectrochemical analysis for systematic production control. More and more industries are finding it necessary to begin with economical instrumentation, then expand their laboratories as needed. These industries will welcome the new model 8950 PCQ.

It has all the accuracy and speed of the automatic Quantometers, yet is priced to meet limited budgets. Routine control analyses of alloys and materials are made many times faster than by chemical means.

Production can be accelerated, more accurate quality control maintained, real savings gained in labor and time!

Ask an ARL field engineer for the exact setup to meet your requirements.

Secret of flexibility

"UNITIZED CONSTRUCTION"

Basic instrument allows determination of eleven elements of your choice. By simple addition of components, can be expanded to fully automatic operation, and up to 35 elements simultaneously analyzed.

Applied Research Laboratories

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bore sizes on the same basic block.

Cylinders replacement is simplified, which is especially of interest to those manufacturers who use the same type of engine in both cars and trucks.

Finally, this design is adaptable to die cast aluminum blocks, which have been the subject of considerable research and interest in the automobile industry.

Machining:

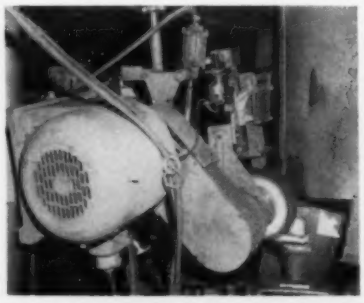
Automatic buffing provided for complex casting.

In an automatic buffing operation at Black & Decker Mfg. Co., Towson, Md., a complicated casting, 5 in. in diam and 6½ in. long, including most of an electric saw handle, is successfully buffed. Because of numerous projections, it seemed impossible at first to buff this casting automatically.

The casting is repositioned several times during the buffing process, so that wheels set at different angles and positions can hit the various surfaces of the part.

Spindle Holds Wheel

A spring-balanced spindle holds the buffing wheel, permitting it to ride the casting beneath it. The ratchet mechanism shown above the buff automatically feeds buffing composition to the wheel.



Electric saw housing (at lower right) is automatically buffed.

The specially - designed automatic buffing machine passes the casting, on a turntable, under a series of buffing wheels. These wheels are made up of sections of a ventilated buff, supplied by Hanson - Van Winkle - Munning Co.,

Matawan, N. J., and called Ruff-L-Buffs.

Ruffle construction of the H-VW-M buff circulates air through the buff as it turns, dissipating heat faster than conventional buffs. This type of buff has proved especially successful in high production operations.

Instruments:

Temperature correction system cuts rejects by 17 pct.

Sizeable reductions are reported in the number of rejected parts and in scrap, due to a new temperature correction process developed and used in metal working operations at the Wright Aeronautical Division of Curtiss-Wright Corp., Woodridge, New Jersey.

The savings have been accomplished through the use of a three-dial slide-rule devised at the plant under a continuing Curtiss-Wright program to increase production and reduce costs through a better understanding of the machining processes and control of materials, tools and machines.

The slide rule type Thermal Expansion Computer reduces temperature difficulties in the machining and inspection of large, close-tolerance parts for reciprocating and jet engines. The device is said to provide a workable and economic approach to reduced scrap and rework caused by thermal variations.

Expansion Problem Found

It is a solution to a problem that Curtiss-Wright studied when it was determined that magnesium and aluminum parts have greater expansion rates than the steel or gray iron gages or masters used to check them. Because of this variability, part dimensions inspected under high shop temperatures (or when gage and part temperature differentials exist) will differ significantly from the same dimensions gaged at the standard measurement of 68°F.

Engineers decided that a method of computing temperature cor-

An Orderly Salvage Program... Built Around a G-H Hydraulic Baler... *Could be the Solution!*

A well integrated scrap metal salvaging operation, built around the right kind and size of scrap metal baling press, may be the key to neat, orderly disposal of your sheet metal scrap . . . profitably . . . with minimum disturbance to production.

Galland-Henning Hydraulic Balers for sheet metal scrap are fast, powerful, rugged and efficient. They convert stampings, clippings and other light sheet metal scrap into dense compact bales always in demand by mills, foundries, and smelters.

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SCRAP METAL BALING PRESSES

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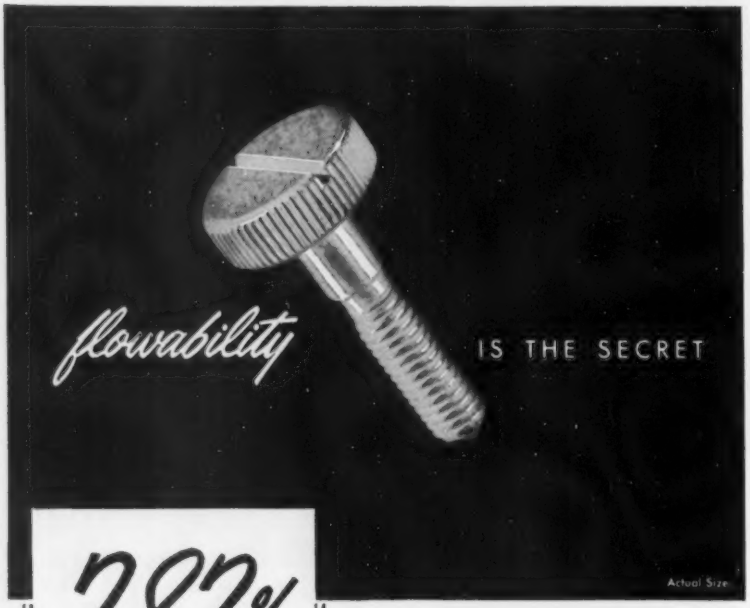
KEYSTONE XL COLD HEADING WIRE



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USING KEYSTONE XL COLD HEADING WIRE

This circuit breaker part was machined at one time. But, cold-heading experts analyzed its design and decided that it could be successfully formed from Keystone "XL" Cold Heading Wire. The result—a material waste reduction from 75% to 7%—and a saving of 282% in steel, plus faster, lower cost production and a finished product that is stronger and free from defects.

Keystone "XL" Cold Heading Wire is not just ordinary cold heading wire. It is wire made to your specific order to exactly solve your difficult cold heading problems. Special drawing, annealing and coating "secrets" produce a wire of exceptional *flowability*. Originally developed for recessed head screws, Keystone "XL" Wire is now widely used to solve many of the toughest cold heading problems at great savings in time and money.

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Get your copy of a new, valuable reference book containing many technical and informative facts about the modern cold heading process. Remember, too, that Keystone specializes in all types of wire for all types of industrial needs. Write us about *your* need!

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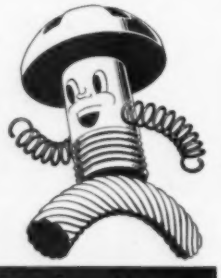


KEYSTONE WIRE *for Industry*

rections—rather than comparable material gaging, increased use of refrigerated coolants or air conditioned areas—would provide the most practical solution, and would be applicable to conditions met both in manufacturing and inspeciton operations. Other considerations in the selection of this approach were the relative economy of the method compared to the alternatives available, and its flexibility and suitability to the manufacture of parts subject to numerous engineering changes.

Specifications Classified

As a preliminary requirement, engineering materials specifications were classified by material types (e.g. aluminum, magnesium, bronze, etc.) and the related coefficients of expansion were obtained. An operating procedure for shop application of correction factors was formulated in the Industrial Engineering and Planning Department of Wright Aeronautical involving the use of a slide rule type computer and a portable pyrometer.

Gaging policy was formalized and indicating type gages were provided for the control of close tolerances on large dimensions. Priority listings were furnished of those part operations on which temperature effects were considered problems, and an operating procedure was establishing involving the use of a slide rule type computer and a portable pyrometer.

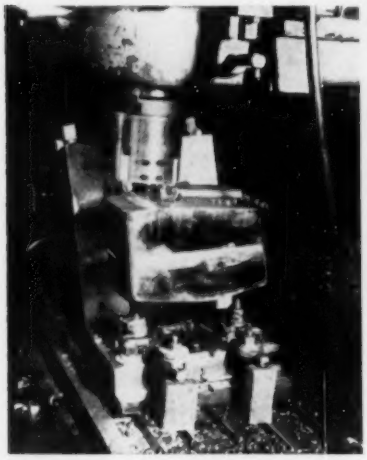
Milling:

More forgings processed with carbide cutter.

Twice as many steel forgings are reported being milled between tool regrinds at H. W. Loud Machine Works, Inc., Pomona, Calif.

The reason four to six forgings can be milled between tool regrinding—instead of two or three—is said to lie in the switch to a new steel-cutting carbide that was specifically created to increase productivity on high or low speed machines.

According to Loud production reports, a repeated schedule has been the milling of a 7- x 10-in. face on a SAE 4130 steel forging. More than 1 in. of stock must be removed since the basic forging is used for both left and right hand parts.



Steel-cutting carbide reduces regrinding frequency.

Aiming at boosting production between tool grinds, the Loud firm changed to the recently introduced grade K21 cutter. This material is a new general-purpose steel cutting grade that Kennametal Inc., Latrobe, Pa., says has extremely high edge strength, plus a resistance to edge wear, cratering and breaking.

Testing:

Sampling system provides O_2 measurement in open hearths

A new gas sampling system for the measurement of O_2 content in open-hearth flue gases has been successfully field tested according to the manufacturer, Leeds and Northrup Co., Phila. The new system, designed to use the firm's magnetic type oxygen analyzer reportedly solves the problem of obtaining a continuous, dirt-free sample with a minimum of maintenance. (Reliable measurement of O_2 content as an index of furnace performance is described as offering the promise of faster heats

COST LESS THAN OTHER CRANES FOR SIMILAR LIFTING JOBS

Series "D" 'Load Lifter' Cranes are for average industrial service. To keep quality high and prices low, they are highly standardized. We build them in 1 to 20-ton capacities with spans up to 80 feet and with cage or floor control. You can order the exact crane you want from a catalog and get a combination of features not available entirely even in the most expensive cranes! For example:

- High hook lift with comparatively low headroom provides a plus value in lifting on every installation.
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- Positive magnetic control: push button on floor-operated cranes; master switches on cage-controlled cranes. Meet specific needs without compromise.
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- Double braking system controls drift, provides for fast, accurate spotting; adds extra safety.
- Rugged hoisting trolley gives efficient service under tough operating conditions.
- Three-girder bridge on moderate span cranes; box-section welded girders on cranes with spans over 50 feet. Strength where strength is needed most eliminates whipping and skewing.
- Reduce your load-handling costs substantially with an efficient, economical Series "D" All-Electric 'Load Lifter' Crane. Catalog 221 contains complete size, type, trolley style, span and other data. Write for a copy and make your selection.

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Builders of "Shaw-Box" and 'Load Lifter' Cranes, 'Budgit' and 'Load Lifter' Hoists and other lifting specialties. Makers of 'Ashcroft' Gauges, 'Hancock' Valves, 'Consolidated' Safety and Relief Valves, 'American' and 'American-Microsen' Industrial Instruments, and Aircraft Products.

and thus increased steel production.)

Arrangement of a typical analyzer system for an open-hearth furnace includes sampling tubes with accessory equipment installed in each down-take and connected by ¼ in. OD copper tubing to the analyzer. The analyzer and its recorder or recorder-controller can be located up to 200 ft from the sampling point, with as little as five seconds lag in the sampling line.

One such system is installed at Jones & Laughlin Steel Corp. in Pittsburgh. Here, a recorder-controller is used to adjust the fuel-air ratio automatically for optimum combustion efficiency.

Sampling System Described

The L&N-engineered sampling system can comprise (1) a water-jacketed probe, (2) a steam ejector, (3) a jet condenser, and (4) a centrifugal separator.

The sample probe has an outer jacket through which water continuously circulates to cool the tube against the effects of the high temperature flue gas. In the center of the probe a tube carries filtered water to a nozzle assembly which washes the probe opening with jets of water. These jets keep the end free of slag. Small radial sprays from the nozzle flush the sample passage to prevent accumulation of dirt.

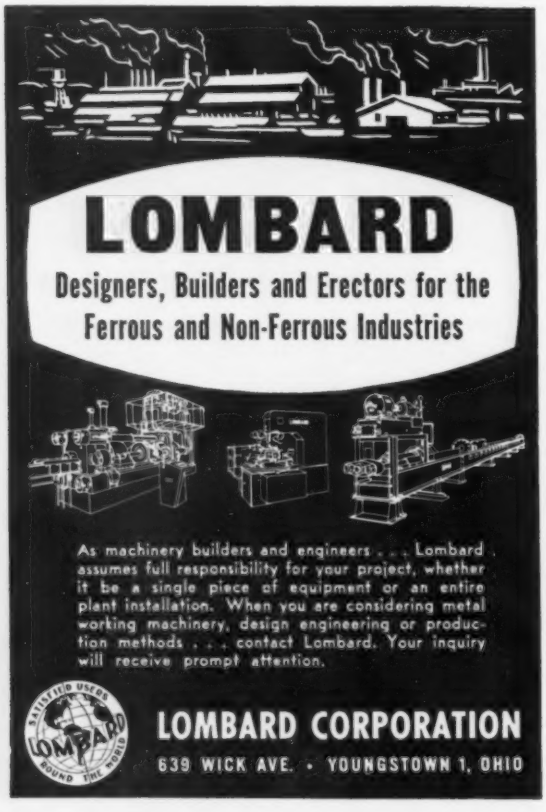
Panel board shows oxygen analyzer and recorder-controller.

Corrosive Gases Removed

The mixture of flue gas sample and wash water are drawn from the probe by suction of a steam ejector. Steam thoroughly mixes with the gas and dirt, and the mixture passes to a jet condenser. In the condenser, a water jet causes the steam to condense, thereby wetting the dirt particles thorougly so that they can be removed in the centrifugal separator. The condensation process also removes corrosive gases.

Water and wetted dust are spun to the outer periphery of the separator and then flow to the bottom. The clean gas sample leaves the top of the separator, under positive pressure which delivers it to the analyzer at high velocity and eliminates chances of sample contamination due to leaks in the piping. And this thoroughly scrubbed, acid-free sample assures minimum system maintenance by eliminating plugging or corrosion of the sample line.

The two gas sample lines from the sampling systems are connected to a reversing valve at the analyzer-recorder panel.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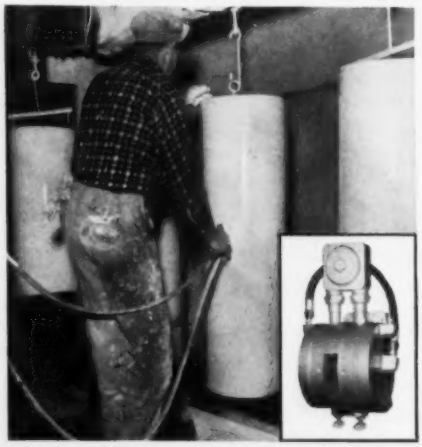
Hot Spray Ups Production for Water Heater Manufacturer



Rheem's Houston plant uses hot spray heaters in all its product finishing operations. Before installation of hot spray, rejects were an important factor, especially with temperature and humidity changes. When hot spray units were installed, water heater rejects were cut to less than 3%, according to Rheem management.

Rheem uses Spee-Flo Heaters in electrostatic finishing, and lithographing of drum products, for viscosity control. Results: lithograph rejects cut to less than .3 of 1%, a nearly perfect record. For booklet write Spee-Flo Co., Dept. IA-9, 720 Polk, Houston, Texas.

In the analyzer, the oxygen content of the sample is measured by the unique paramagnetic properties of oxygen (i.e. it is strongly attracted to a magnetic field). With an electrical circuit designed to minimize errors due to changes in gas pressure, the analyzer produces a signal directly proportional to the O_2 content of the gas. This signal is measured by an L&N electronic recorder calibrated directly in pct of oxygen.

Materials:

Combine rubber-aluminum for improved caulking.

Sparkling bits of aluminum in the form of microscopic, rolled flakes are being interlocked with rubber to provide a new caulking compound designed to boast high durability and a glistening surface.

Called Aluminum Rubbertex, the compound is being produced and marketed by the Overall Paint and Lead Co., Inc., of Cleveland. The producer claims this is the only rubberized caulk now geared, in color and quality, for use with long-lasting aluminum doors, windows and other aluminum building materials. It gives a complete weld-like bond that blocks out moisture, air and sunlight.

Claiming that many caulking problems are overcome or minimized with Rubbertex's combination of aluminum and rubber, the makers state that in addition to longer life and added adhesion, the ingredients assure a soft, pliable compound. Extra oil retention is afforded with absolutely no oil-bleed or sag.

The combination of aluminum flakes and rubber base is said to afford extraordinary expansion and contraction protection. Tests have indicated that Rubbertex withstands stresses and strains of quick-changing temperatures better than most other types of caulking material.

The over-all job in

Production Lines and Special Automatic Machines

by

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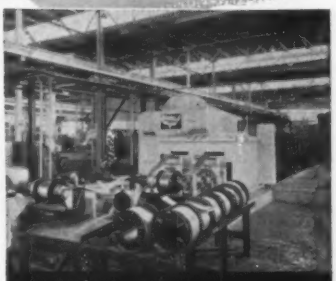
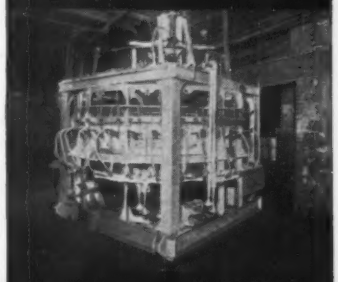
for military production...



Continental Automatic Strip Production Line consisting of annealer, pickling machine, dryer, and coiler.

Continental Special Automatic Pig Molding Machine complete with automatic charging, melting, and pouring.

Continental Automatic Production Line operating from raw materials to completely finished and packed product. This production line consists of fifteen integrated, synchronized, special automatic machines.



Continental Special Automatic Glazing Machine complete with automatic press synchronizer and fire polisher.

For maximum production of military items manual operations must be eliminated. With CONTINENTAL Special Automatic Machines and Integrated Production Lines production goes on in a continuous flow with better, more uniform products with a minimum of man hours.

CONTINENTAL jobs begin with analysis of the requirements, then the selection and development of proper methods for greatest results. Finally follows the design, the building, and the installation of the machines—delivering a COMPLETE UNITIZED PRODUCING PACKAGE with results guaranteed.

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MANUFACTURERS—ENGINEERS—CONTRACTORS FOR OVER A QUARTER OF A CENTURY

NEW EQUIPMENT

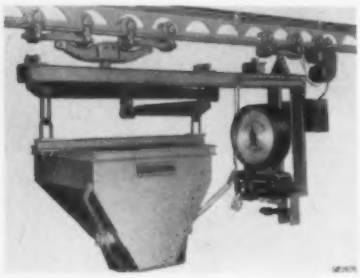
New and improved production ideas, equipment, services and methods described here offer production economies . . . for more data use the free postcard on page 121 or 122

Radial drill incorporates flame hardened column

A new precision radial drill, which features a flame hardened column, also incorporates an extra large table 28½ in. x 48 in. (provided with ¾ in. tee-slots), radial operation and the production possibilities of such a unit. Recommended for production of tools, dies, jigs, fixtures and similar work, the drill's 3 ft arm is raised and lowered by an individual motor with finger-tip control. Sixteen geared speeds of 50 to 1400 rpm with easy-mesh gears are grouped so any gear speed can be selected at will with the hand levers. *Veet Industries.*

For more data circle No 29 on postcard, p. 121

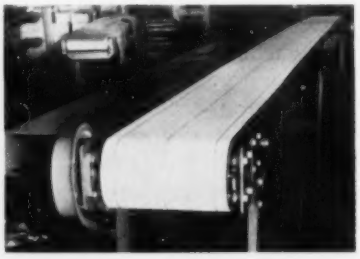
Traveling hopper provides extra filling area



A tractor-driven traveling hopper with scale, designed for handling pottery clay and other bulk materials, is so located with respect to the track on which it travels that an extra large opening is provided at top for filling. Having a 1 cu yd capacity, the hopper is emptied by means of a bottom gate which can be manipulated from both sides of the bucket. A 5000 lb dial scale with tare beam enables accurate weighing of ingredients as they are gathered from overhead storage bins. Load bar rides on 12 ball-bearing equipped wheels. *Cleveland Crane & Engineering Co.*

For more data circle No. 30 on postcard, p. 121

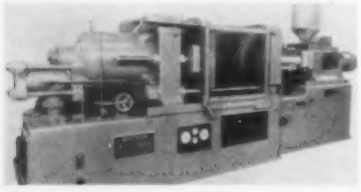
Light duty conveyor added to equipment line



A new conveyor, designated as a light duty slide bed conveyor, is available in belt widths of 8 to 12 in. and 16 in., and in lengths of 10 to 70 ft. max (depending on load and speed) in multiples of 10 ft. Standard elevation adjustable—31 to 37 in. Powered by a right angle gearhead ¼ hp, 1-60-110 v motor for fixed belt speeds of 25, 37½ or 50 fpm. Available with or without side leaves or guard rails. Drive pulley 6 in. crown faced lagged, and take-up pulley 3⅛ in. crown faced. *Island Equipment Co.*

For more data circle No. 31 on postcard, p. 121

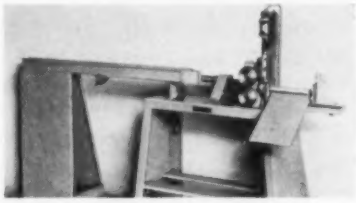
Higher rates cited for new plastic molder



Faster cycles and higher plasticizing rates are claimed for a new 24 oz horizontal plastics injection molding machine. The unit incorporates a straight hydraulic mold clamp with an adjustable clamping stroke. The injection plunger is prepositioned so that the mold is filled immediately after dies are clamped. *Watson-Stillman Press Div., Farrel-Birmingham Co., Inc.*

For more data circle No. 32 on postcard, p. 121

Cut-off machine for extrusions handles all lengths



A cut-off machine for extruded materials is designed to handle any extruded metal that can be accommodated, cut any length size and on sizes up to ½ in. Speeds can be adjusted at any rate of extrusion. Air cylinders, controlled by micro-switches, actuate the rolls and cut-off blade. The rolls pull the extruded material and dies can be made to mark the material being extruded. *Klaas Machine & Mfg. Co.*

For more data circle No. 33 on postcard, p. 121

THIS PROPOSAL CAN SAVE *YOU* REAL *MONEY*

Reports on capital investment savings on the purchase of Portage 4" spindle Horizontal Boring, Drilling and Milling Machines have been as much as 20%. In addition, the initial saving is only part of the story. When you consider operating expense vs. capital investment . . actual dollars saved are even greater than the initial 20%.

It will pay *you*..in more ways than one..to get a proposal from Portage before making a final buying decision.

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Reel offers lateral adjustment for feeding coil stock

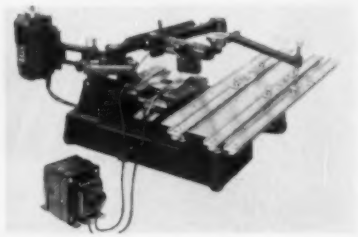
Described by the manufacturer as the only reel offering lateral adjustment for angular feeding of coil stock, this unit is mounted on rails. This permits lateral adjustment to be made by rotating a crank at the rear of the reel. The crank actuates a lead screw which, through a bronze nut, moves the entire reel into the proper location. The crank can be operated by hand or motorized to suit the user's preference. This lateral adjustment is designed to assure perfect alignment of the coil stock with the die. Unit's 4 expander arms are operated in unison by positive power. They will accommodate center ID's from 15 in. to 28 in. without adapters. Controls are for one-man use. *Sesco, Inc.*

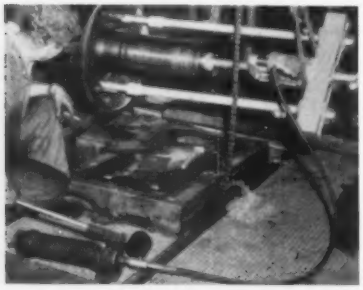
For more data circle No. 34 on postcard, p. 121

Electric arc etcher provides legible marking

A new tracer-guided electric arc etching unit is designed to offer the legibility of a clean black identification on tools and parts made of hardened steel and its alloys. Designed to eliminate the use of acids, the unit, the manufacturer states, simplifies the marking of rounded surfaces, convex or concave, as well as irregular contours. The marking reportedly leaves no burrs. A further advantage is ability to mark parts in finished state. *New Hermes Engraving Machine Corp.*

For more data circle No. 35 on postcard, p. 121





Unit supplies pulling power for maintenance work

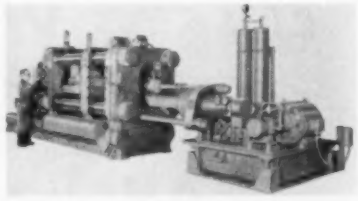
A 50 ton hydraulic puller set is designed to provide heavy duty pulling power for maintenance work on large industrial machine tools, turbines, industrial tractors, mining machinery and other heavy equipment. The set includes all the basic items to remove and install gears, bearings, pulleys, sheaves, pinions, sprockets and other tight fitting parts. It features a hydraulic ram designed especially for the firm's pulling systems. The set is available with either electric or hand operated pump. Pulls without distorting parts. *Owatonna Tool Co.*

For more data circle No. 36 on postcard, p. 121

Diecasting machine developed for large aluminum parts

Aluminum parts weighing up to 35 lb can be cast on a new 800 ton diecasting machine. This cold chamber machine, reported to represent a new approach to diecasting, has a positive, self compensating mechanical link-wedge which locks the clamp to the rated tonnage. Push-button control provides daylight and tonnage adjustment. *Hydraulic Press Mfg. Co.*

For more data circle No. 37 on postcard, p. 121



Radiant heaters offer wider range of application

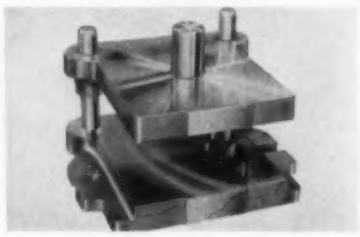
A much wider range of application is the principal advantage offered in two new types of radiant heating equipment. These heating components include quartz lamp oven sections and radiant rod oven sections, both designed for easy assembly into complete infrared ovens. The quartz lamp equipment was developed to accommodate a new source of radiant energy particularly suited to high temperature applications. The radiant rod units are designed for efficient, low cost infrared equipment on industrial applications. *Fostoria Pressed Steel Corp.*

For more data circle No. 38 on postcard, p. 121

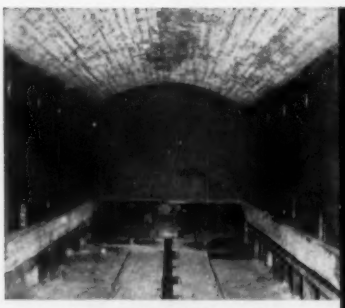
New line of die sets and diemakers' supplies ready

A complete new line of die sets and diemakers' supplies have been developed which are described as incorporating the following advantages and others: precision lapped chrome-plated guide posts; demountable bushings available as an optional feature; oil fittings positioned so they are easily reached from front or side of the press; complete new line of long and short shoulder bushings. *Danly Machine Specialties, Inc.*

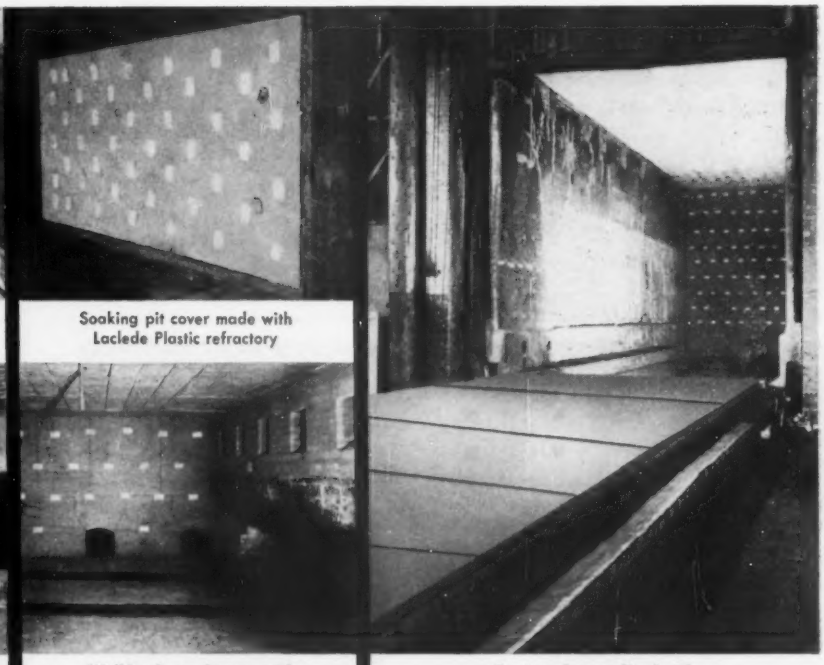
For more data circle No. 39 on postcard, p. 121



Profitable trends in the use of refractories



Car-type forge furnace with Laclede castable refractory walls



Soaking pit cover made with Laclede Plastic refractory

Batch-type reheating furnace lined with Laclede Castable

Walking beam furnace with Laclede Plastic side and end walls

Car-type furnace lined with Laclede Castable and Plastic Refractories

Time and cost savings explain increasing use of LACLEDE Castable and Plastic Refractories

Increasingly successful and profitable uses of castable and plastic refractories are changing refractory practices in many mills and plants. Experience shows that when castables and plastics are properly selected and installed, time and cost savings may amount to 300% or more. Results plus ease and speed of installation contribute to these savings.

Correct selection of castables and plastics is simplified by the availability of a complete range of Laclede-Christy products. Laclede-Christy produces castables and plastics to meet every condition.

Laclede offers refractories for high or moderate temperature service, and to meet specific insulating property requirements. Specific qualifications such as refractoriness, strength, thermal conductivity, abrasion-resistance and erosion resistance are met in varying degrees, according to the castable or plastic recommended and selected.

Undoubtedly you can use Laclede-Christy Castables and Plastic Refractories to profitable advantage. What's your situation? What more would you like to know? Your nearby Laclede-Christy representative will be glad to give you specific information.

Laclede-Christy Castable and Plastic Refractories

Castables for high temperature service to 2400° F and higher: Steelcast, Firmcast, Super Castable, Gun Cast and 3000° Castable.

Castables for insulating properties and service temperature to 2400° F: Porelite, Porelite 50, Porelite VL.

Pitco Plastic — for high temperature service (3150° F), where metal oxide penetration is severe.

Super-Set Plastic — for high temperature service (3150° F), where air dried bond is a factor, and where heat cannot be applied shortly after ramming.

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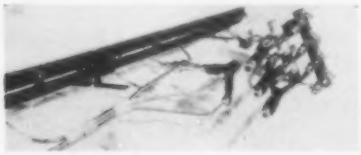
Strip burner provided for titanium sheet

Used mostly for heating titanium sheet and some types of stainless steel, a strip burner employs either natural gas and oxygen or bottled (propane or butane) gas and oxygen for fuel. The flame may be regulated from a very fine needle point to a flame that is flat and wide. *W. C. Cheney Mfg. Co.*



For more data circle No. 40 on postcard, p. 121

Slide rule

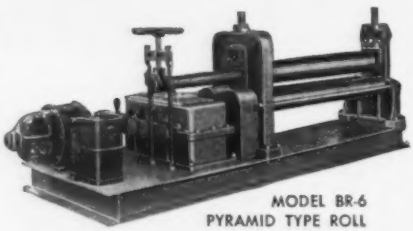
New light alloy slide rules made in green-yellow to eliminate violet and red rays which focus in front of and behind the retina are designed to protect eyesight. This type of shade coincides with optimum sight point of the spectrum to cut eyestrain, blurring and eliminate errors in reading calibrations. The units have a non-corrosive, non-rusting metal construction as a safeguard against warping, swelling and binding. Made in 6 in. and 10 in. Trig, Log-Log standard rules or to special order. *Pickett & Eckel, Inc.*

For more data circle No. 41 on postcard, p. 121

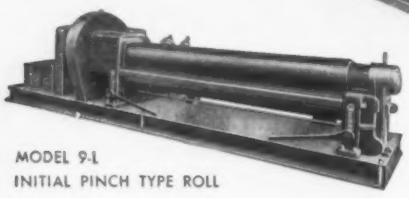
WEBB PLATE FABRICATING MACHINERY

PLATE BENDING ROLLS

The Webb Corporation offers a complete line of Plate Bending Rolls for the rolling of the thinnest plate up to plate 2½" thick. Offered in a variety of lengths and thicknesses. Constructed for the modern fabricating shop.



MODEL BR-6
PYRAMID TYPE ROLL

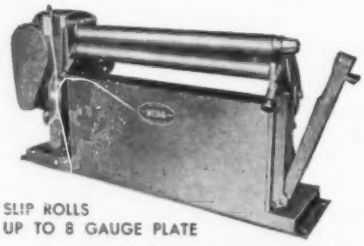


MODEL 9-L
INITIAL PINCH TYPE ROLL

Two types available: the Initial Pinch Type and Pyramid Type machines. All latest advantages of today's modern machine tools are incorporated, utilizing anti-friction bearings, totally enclosed gear drives. Special forming rolls for culvert pipe, stock tanks and other special shapes available.

SLIP ROLLS

A complete line of small Sheet Metal Forming Rolls are also available. All power-driven with shaft sizes 3" to 5" for the handling of the thinnest gauge material, up to 8 gauge material. Special rolls for the forming of polished sheets, aluminum and stainless steels can be furnished. Complete catalogues on any size machine furnished upon request; write Dept. E.



SLIP ROLLS
UP TO 8 GAUGE PLATE

Let Speed PAY–The WEBB Way!

SLIP ROLLS

PYRAMID TYPE ROLL

INITIAL TYPE ROLL

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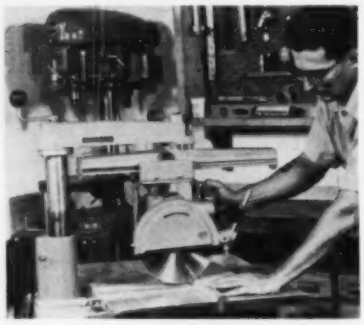
New radial arm saw

A new 9 in. radial arm saw, described as offering the fullest and freest blade travel and the greatest power in its size range, is fully portable. It offers the following features: a ¾ hp motor, the first dual voltage motor to be incorporated in a 9 in. radial saw, and a turret arm or double overrun construction which brings the pivot point of the saw arm directly over the center of the table. *Rockwell Mfg. Co.*



For more data circle No. 42 on postcard, p. 121

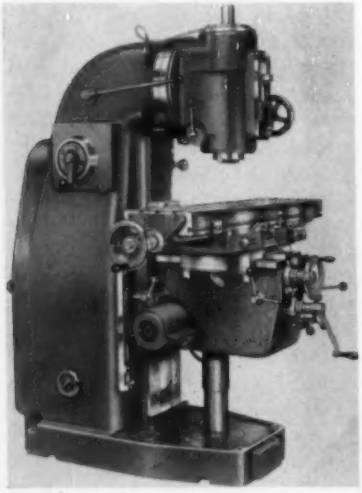
Vibrating screen

A new high-speed vibrating screen reportedly 30 to 80 pct faster has been developed for the fine screening of such materials as sand, clay, fertilizers, chemicals, coke, coal, asbestos and detergents. The new screen has a speed of 3300 rpm when set for a 1/32 in. stroke and 2400 rpm when operating on a 1/16 in. stroke. The unit is especially designed for use with screen cloth of 10 to 80 openings. *Hewitt-Robins, Inc.*

For more data circle No. 43 on postcard, p. 121

Vertical miller

A Model VF-54 of a Swedish-made vertical milling machine is now available in this country. The unit's table working surface is 47¼ in. x 11 in. Longitudinal power feed is 33½ in. Transverse and vertical travel, either by

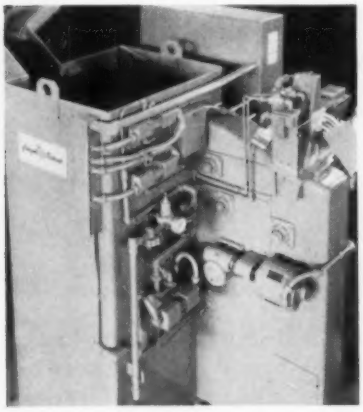


hand or power, are respectively 12 in. and 18 in. Twelve spindle speeds—selected by direct reading dial and single crank—are available in ranges from 39 to 1500 rpm. *Austin Industrial Corp.*

For more data circle No. 44 on postcard, p. 121

Hopper feeder

A hopper feeder receives parts—such as gear blanks, bearing races, pistons, screw machine products—at any rate, in bulk, with random orientation and discharges them, orientated and aligned, for the next machine at any position and on demand of the machine. Its design is standardized so that no basic engineering changes are required to fit the hopper to a wide range of machines, processes and parts sizes and shapes. *Cargill Detroit Corp.*



For more data circle No. 45 on postcard, p. 121

Bar gages

A series of large diameter bar gages, providing 0.0001 in. accuracy for inside or outside diameters as large as 36 in. has been announced. Incorporating a design whereby special inspection requirements can be included quickly and economically, it is said to solve the problem of how to inspect highly accurate large diameters at specific gage points on shoulders, or in grooves. Variability between 9 in. and 36 in. *Rimat Gage Co.*

For more data circle No. 46 on postcard, p. 121

"Doc! It's like fighting DERMATITIS with an armored glove."

Except WEST *protective gloves* are invisible.

– quickly applied
– comfortable to wear
– easily washed away.

For skin exposed to oils, dust, grease and grime:
– use PROTECTIVE CREAM #211.

For skin exposed to acids, alkalies and inorganic chemicals:
– use PROTECTIVE CREAM #311.

For skin exposed to organic solvents, acetates and cutting oils:
– use PROTECTIVE CREAM #411.

WEST PROTECTIVE CREAMS protect against hundreds of troublesome industrial irritants.

Too, they're antiseptic. Inhibit harmful bacteria with Hexachlorophene. And most important, they protect *for extended periods of time.*

LET a specially trained WEST representative tell you more about WEST PROTECTIVE CREAMS and the WEST Dermatitis Control Program. Just write. Or telephone your local WEST office.

Largest Company of its kind in the World

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FREE BOOKLET
Use your business letterhead to request our 24 page booklet on controlling skin irritation.

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MONEL • NICKEL • COPPER • ALLOYS
THIN STRIP

±.0004″ is run-of-the-mill

Typical of the care that assures absolute uniformity in all Somers THIN STRIP is this 4-high mill equipped with the latest electronic gages and controls. Here thickness is constantly checked throughout the run, and maintained within ±.0004″ or less on gages from .010″ down. The slightest variation may be instantly corrected.

No matter how exacting your requirements may be for thin strip metal, you can depend on Somers quality control, equipment and experience to guarantee uniform quality every time—all the time.

Somers Brass Company specializes in rolling nickel and its alloys from .020″, and copper and its alloys from .012″ both down to .00075″.

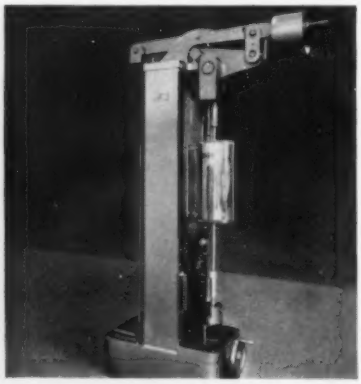
If you now have, or anticipate, a problem with exacting standards of this strip metal write:

FOR EXACTING STANDARDS ONLY
Somers

Somers Brass Company, Inc.
WATERBURY, CONN.

Creep tester

Four basic types of creep tests can be performed on a newly designed creep testing machine of 20,000 lb. The machine, with different subassemblies, can be used for long time creep tests, load being applied and measured by weights on a



lever arm, and (2) for creep-rupture tests with motor-driven screw loading under the control of a load transducer and null-balance controller. The same basic machine with different components can also be used for relaxation tests and constant strain rate tests. *Baldwin-Lima-Hamilton Corp.*

For more data circle No. 47 on postcard, p. 121

Hose coupling

A new no-skive type of re-usable fitting has been developed for hydraulic hose assemblies. The new fitting, consisting of socket and nipple, does not require the hose cover to be stripped off. Make-up is accomplished in two steps: (1) the hose is rotated into the socket counter-clockwise and (2) the nipple is screwed clockwise into the hose and socket. The fitting line offers four different connecting ends: (1) tapered male pipe thread, (2) new straight thread with O-ring sealing, (3) J. I. C. standard Triple-lok 37° flare nose for tube connection, and (4) swivel nut for connection with any Triple-lok adapter. *Parker Appliance Co.*

For more data circle No. 48 on postcard, p. 121

★ PUNCHES ★ DIES ★ RIVET SETS ★ COMPRESSION RIVETER DIES ★

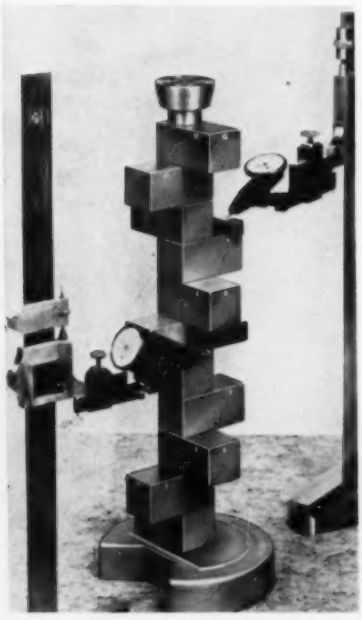
52 years making quality punches and dies. Our many customers throughout the nation repeat year after year because they know they can rely on our tools for consistent performance.

Write Dept. B for New Catalog 54

GEO. F. MARCHANT COMPANY
1420-34 So. ROCKWELL STREET • CHICAGO 8, ILLINOIS

Gage unit

A new unit, called the Inchmaster, is designed to speed gage setups. This one unit, portable aid is constructed of a stack of individual gage blocks, so arranged that portions of both the upper and lower surfaces of each block are exposed for quick and easy setups. The blocks are one inch thickness so that the full inches are directly



available on the instrument—intermediate sizes are made up of standard gage blocks and placed upon and/or below the proper unit block to obtain the required dimension. Designed so that any combination of blocks within the range of the unit is perfectly safe. *Orion Tool Co.*

For more data circle No. 49 on postcard, p. 121

Tape cutter

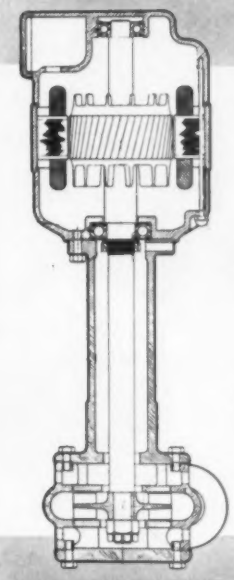
An adjustable cutter for use with heavy duty strapping tapes is now available. The cutter, made of heavy molded plastic with a steel cutting edge, is designed for use with either ½ in. or ¾ in. tapes and can be adapted quickly for either size. The fine-honed edge is suited for cutting the heaviest strapping tapes in common use. *Permacel Tape Corp.*

For more data circle No. 50 on postcard, p. 121

Take a Good Look

AT THE **Ruthman**

Gusher Coolant Pumps



SIMPLE DESIGN

Gusher Coolant Pumps are designed so that they require no packing, foot or relief valves. They consume less power when throttled and there is no metal-to-metal contact in the pump, insuring long life with minimum attention.

RUGGED CONSTRUCTION

All castings have been strengthened through time-tested operation. The one-piece shaft is precision ground, which rotates on heavy-duty precision ball-bearings.

DEPENDABLE PERFORMANCE

The entire rotating shaft is dynamically balanced to eliminate vibration and wear. Pre-lubricated ball-bearings with surplus grease pocket require no further attention. Your Gusher is always primed . . . ready to deliver coolant in a split second.

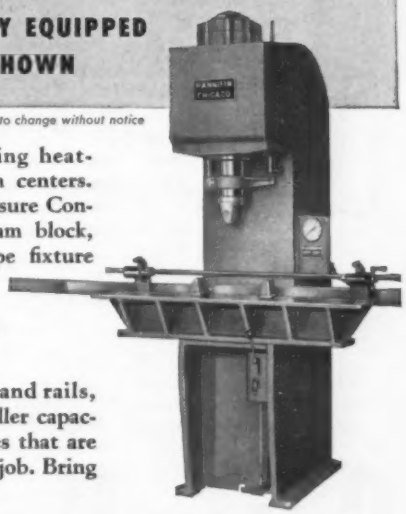
THE **RUTHMAN** MACHINERY CO.

1809-1823 Reading Road — Cincinnati 2, Ohio

This 25-TON Hannifin Straightening Press Sells For

$4,179 FULLY EQUIPPED AS SHOWN

Price F.O.B. our press plant at St. Marys, Ohio, subject to change without notice



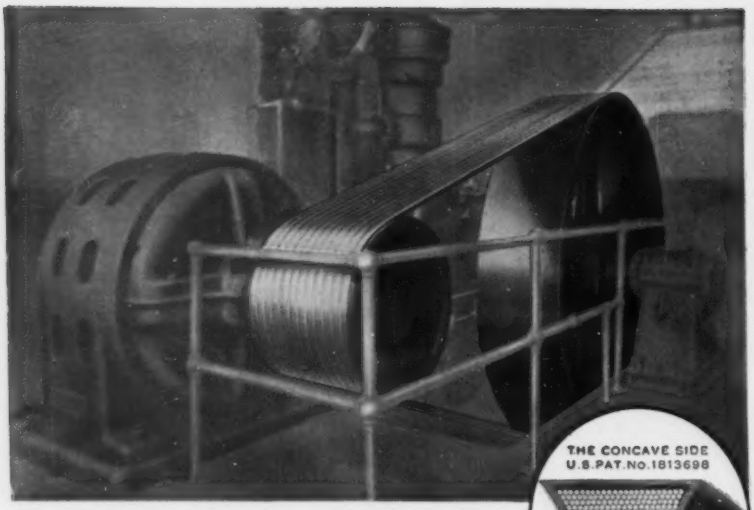
The ideal press for straightening heat-treated parts up to 60" between centers. Exclusive Hannifin Sensitive Pressure Control for speed and accuracy. Ram block, two table blocks and center-type fixture complete with rails included.

STRAIGHTENING PRESSES FROM 5 TO 150 TONS

Hannifin offers longer tables and rails, roller-type fixtures, larger or smaller capacities (5 to 150 tons)—all at prices that are easily justified by savings on the job. Bring us your straightening problems.

HANNIFIN

HANNIFIN CORPORATION, 513 S. WOLF ROAD, DES PLAINES, ILLINOIS



Why a V-Belt with

CONCAVE SIDES

wears longer

Fig. 1

Fig. 1-A

It is easy to demonstrate to yourself why the concave sides (Fig. 1) of the Gates belt greatly lengthen belt life.

Simply bend a Gates belt and feel the sides. Notice how these precisely engineered concave sides *fill out* on the bend and *become straight.* Thus a Gates belt grips the sheave groove evenly (Fig. 1-A) and wear is distributed uniformly across each side of the belt. That means longer belt life; lower costs.

Make the same test with a straight-sided belt (Fig. 2) and see what happens. The sides bulge out on the bend (Fig. 2-A) concentrating the wear at points shown by arrows.

To assure longer wear and keep belt costs down, specify the V-belt with concave sides—Gates Vulco Rope . . . readily available from nearby distributor stocks. The Gates Rubber Company, Denver, Colorado —*World's Largest Maker of V-Belts.*

Fig. 2

Fig. 2-A

There are Gates Engineering Offices and Distributor Stocks in all industrial centers of the United States and Canada, and in 70 other countries throughout the world.

TPA 60

Gates VULCO ROPE Drives

Soldering tool

With a 6-stage selector switch used in conjunction with 3 secondary terminals, 18 heat stages or 18 different voltages from 1.3 to 5.1 can be obtained from the new model soldering tool No. 626. The unit operates on 115 v., 60 cycles, with a wide range of power—5 to 1800 w. Designed to handle

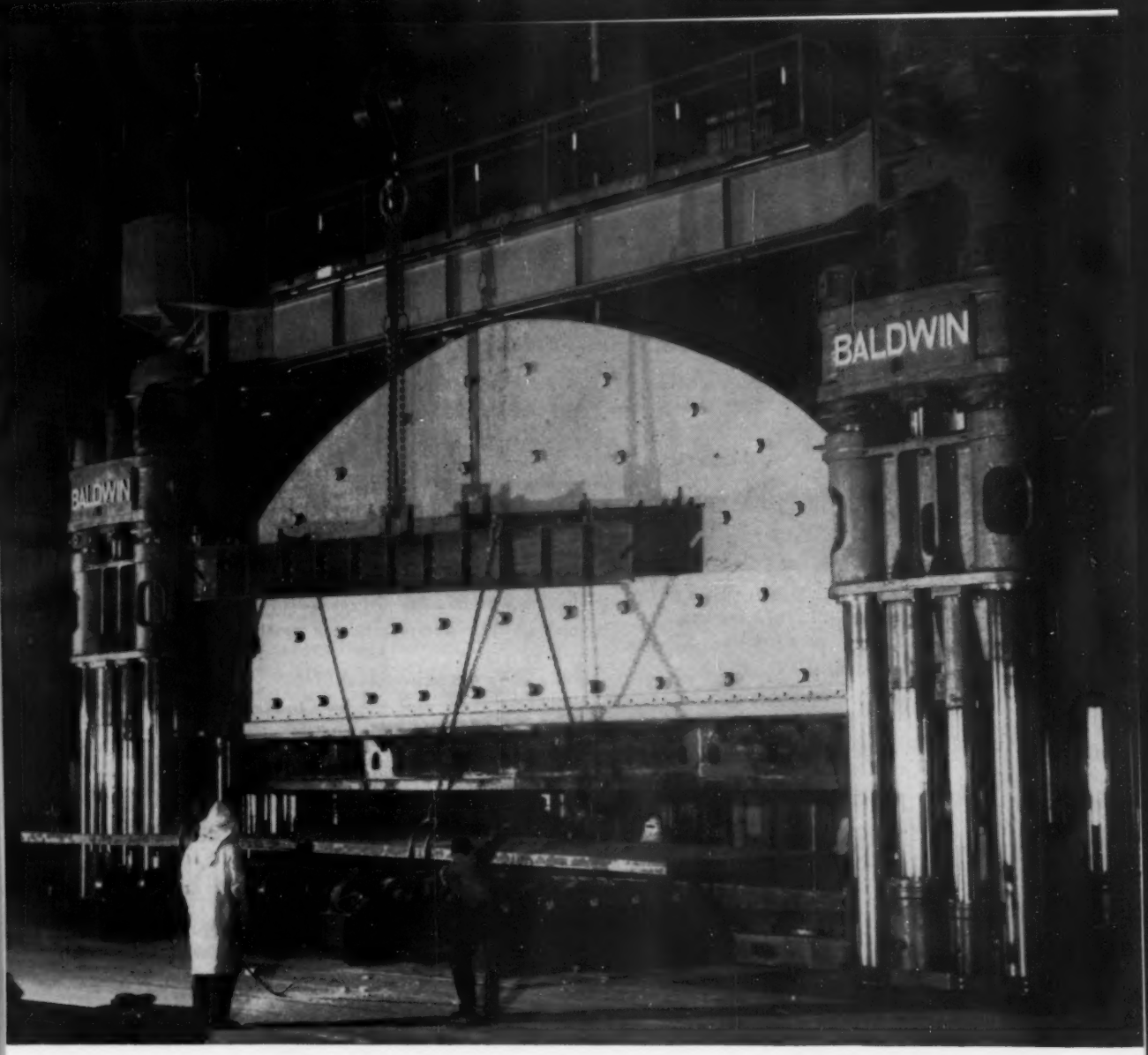
numerous soldering jobs from fine precision work to medium heavy industrial operations with over 16 styles of holders to choose from, the tool is said to perform efficiently and economically when used with carbon electrodes under 3/8 in. in diam. *The Luma Electric Equipment Co.*

For more data circle No. 51 on postcard, p. 121

Coreblowers

A new automatic shell coreblower, Model MCA-5, is designed to perform the entire investment and curing cycle with a single press of a button. A special feature permits automatic rocking of the core box when necessary to empty remotely located recesses. The machine can be adjusted to come to a stop without rocking or to rock a predetermined number of times, all within the automatic cycle. Heat for the core box is supplied by the machine itself so that existing metal core boxes may be adapted for use without special heating arrangement on the Model MCA-5. *Shallway Corp.*

For more data circle No. 52 on postcard, p. 121



World's largest plate bending press built by Baldwin for Foster Wheeler

Now in operation at the Mountaintop, Pennsylvania plant of Foster Wheeler Corporation is an 8,000 ton Baldwin press that bends plate up to 7″ thick and up to 40′ long.

The largest machine of its kind ever built, this Baldwin press permits fabrication of bigger sections than ever before. The press is equipped with a built-in joggling device which allows one man alone at the control panel to move and position the plate for each bend. Approaching the work, the beam edge remains parallel with the bottom platen to within .030″ throughout its length. The beam can also be used in a tilted position for special work.

The engineering and fabrication skills that produced this huge press are always at your service to design and build all types of large metal-forming presses. Baldwin plate bending presses are built in sizes from 1,000 to 8,000 tons, and larger sizes can be built to order. Baldwin's complete line includes hydraulic presses for forging, forming, drawing, flanging and crimping, also mechanical presses and extrusion presses. Whatever your requirements, Baldwin can furnish the right press for the job. For our bulletin 3201 on metal working presses, write to BLH Corporation, Philadelphia 42, Pennsylvania.

BALDWIN BLH LIMA-HAMILTON

EDDYSTONE DIVISION
BALDWIN-LIMA-HAMILTON

DIVISIONS: Austin-Western • Electronics & Instrumentation • Hamilton • Lima • Loewy-Hydropress • Madsen • Pelton • Standard Steel Works

Do you really know the alloys you buy?

For instance, are you SURE of:

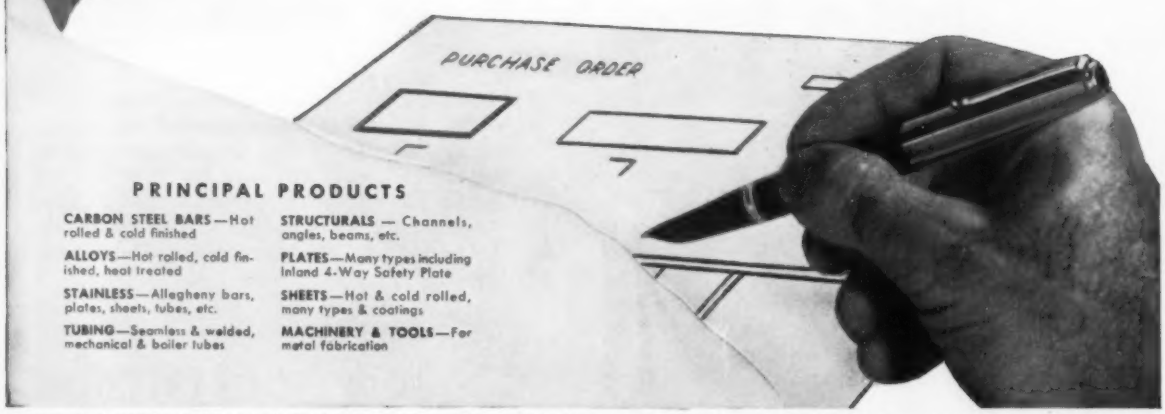
- **Heat identification** . . . not just type identification but the positive identification of your particular heat so you can be sure the alloy steel is everything it is supposed to be?
- **Chemical analysis** . . . not just the chemical range for the type, but the specific analysis of the heat from which your steel was rolled?
- **Hardenability** . . . not just the average hardenability for the type of alloy, but the actual test-proved hardenability of your particular heat of steel?

If you don't know these important facts, you may be in for trouble—loss of time and money; breakdown of equipment. It can happen when you're not sure of your alloys.

But when you work with Ryerson alloys you *can* be sure—sure of the steel you get, sure of what it will do—because Ryerson alloys are certified by an 8-step quality control program.

Every step has a specific purpose—every step is designed for your protection, but doesn't cost you a dime. For alloys with all questions answered, call your nearby Ryerson plant.

RYERSON STEEL



PRINCIPAL PRODUCTS

CARBON STEEL BARS—Hot rolled & cold finished
ALLOYS—Hot rolled, cold finished, heat treated
STAINLESS—Allegheny bars, plates, sheets, tubes, etc.
TUBING—Seamless & welded, mechanical & boiler tubes
STRUCTURALS — Channels, angles, beams, etc.
PLATES—Many types including Inland 4-Way Safety Plate
SHEETS—Hot & cold rolled, many types & coatings
MACHINERY & TOOLS—For metal fabrication

JOSEPH T. RYERSON & SON, INC. PLANTS AT: NEW YORK • BOSTON • PHILADELPHIA • CHARLOTTE, N. C. • CINCINNATI • CLEVELAND
DETROIT • PITTSBURGH • BUFFALO • CHICAGO • MILWAUKEE • ST. LOUIS • LOS ANGELES • SAN FRANCISCO • SPOKANE • SEATTLE

The Iron Age SUMMARY . . .

Steel market is showing continued strength . . . Incoming orders still running ahead of capacity . . . Automotive buyers taking second look . . . Export demand good.

Where's The Letdown? . . . It looks like the so-called letdown in steel demand is turning out to be the little man who isn't there. The market is strong, and incoming orders are running ahead of capacity.

Even automotive seems to be taking a second look at inventories and reinstating tonnages previously cancelled. Detroit purchasing agents are taking no chances on being caught in the middle. The alacrity with which other consumers snapped up released tonnages has made them cautious.

The inventory position of some steel fabricators is so shaky that emergency shipments from the mills are necessary to keep some of them going. And there has been little opportunity for most users to build inventory to a safe level.

The odds are overwhelmingly against a significant easing in the market until mid-year. Steel price increases and possible labor trouble are prodding consumers into grabbing up everything in sight. Users who had let up on the pressure are now kicking themselves.

From Europe, Too . . . Almost lost sight of in the scramble by domestic steel consumers is the strong demand from overseas. European consumers have had to take the crumbs while the mills struggled to keep at-home customers happy. If there is any letup in the U. S., foreign customers will be happy to take up the slack.

It's estimated that potential orders for export now add up to something like one million tons. Even if half of this is "water," the balance is enough to help shore up any domestic weakness.

With demand from virtually all consuming industries showing no sign of slackening, steel production likely will hold at near-capacity levels for the first six months. That is, unless the mills run into maintenance problems that can no longer be postponed.

If steel labor negotiations are settled peaceably, there will be a letdown in third quarter. At that time, too, auto producers will be setting up for production of 1957 models. When production lines begin moving again, there will be another upsurge, and steel demand through fourth quarter will be good.

Backlogs Heavy . . . Plate and structural demand has producers and consumers at wit's end. Producers are sold out through second quarter and could book for the entire year if they wanted to commit themselves that far ahead.

Steel Output, Operating Rates

Production (Net tons, 000 omitted)	This Week 2,548	Last Week 2,548	Month Ago 2,364	Year Ago 2,123
Ingot Index (1947-1949=100)	152.2	152.2	147.7	132.7
Composite price				
Chicago	97.5	98.5	97.5	91.0
Pittsburgh	102.0	103.0*	102.0	90.0
Philadelphia	102.0	103.0	104.2	84.0
Valley	97.0	97.0*	99.0	88.0
West	102.0	99.5	101.0	88.0
Detroit	104.0	103.0	103.0	92.0
Buffalo	105.0	105.0	105.0	100.0
Cleveland	107.0	105.0*	100.0	92.5
Birmingham	96.5	99.0	95.0	85.5
S. Ohio River	91.5	88.0*	89.0	70.0
Wheeling	105.0	105.0*	96.0	98.0
St. Louis	104.0	90.0	99.0	103.0
Northeast	85.0	83.0	80.0	97.5
Aggregate	99.5	99.5	98.5	88.5

*Revised

Prices At A Glance

(cents per lb unless otherwise noted)

	This Week	Week Ago	Month Ago	Year Ago
Composite price				
Finished Steel, base	5.174	5.174	5.174	4.797
Pig Iron (Gross Ton)	$59.09	$59.09	$59.09	$56.59
Scrap, No. 1 hvy (gross ton)	$49.00	$49.50	$53.17	$36.33
Nonferrous				
Aluminum ingot	24.40	24.40	24.40	23.20
Copper, electrolytic	43.00	43.00	43.00	33.00
Lead, St. Louis	15.80	15.80	15.80	14.80
Magnesium	33.25	33.25	33.25	27.75
Nickel, electrolytic	64.50	64.50	64.50	67.67
Tin, Straits, N. Y.	99.50	99.00	104.50	90.125
Zinc, E. St. Louis	13.50	13.50	13.50	11.50

Iron Ore Prices Take Dip

Iron ore prices drop 10¢ per ton on two Lake Superior direct shipping grades . . . Moves restore historic price differential . . . New wire mill slated for Cleveland.

◆ IRON ORE PRICES unexpectedly dipped 10¢ per ton on two Lake Superior direct shipping grades, and producers reversed their decision to pass on freight rate increases to customers.

Major firms have notified their customers that prices would be cut back on Mesabi bessemer and non-bessemer ores and freight changes absorbed to meet a recent price schedule announcement by Oliver Mining Div., U. S. Steel.

Earlier this year, producers had announced an 85¢ increase on these grades, while the later increase by Oliver was held to 75¢.

The new move restores the historic 25¢ per ton differential between the Mesabi and Old Range ores as well as the traditional freight rate absorption by the seller.

SHEETS AND STRIP . . . **Chicago** mills continue to insist that they will wipe out carryovers in deliveries during the first quarter, but some producers admit that second quarter quotas will have to be shaved to do it. There have been a few reported instances of some relaxations on quotas, but customers aren't showing much elation about these so far. Despite a mild slowdown in warehouse sheet sales in the past few days, some brokers have been buying warehouse coil again at prices varying from straight warehouse to actual premiums. Which seems to suggest that the slight sheet slowdown at the warehouse level isn't indicative of any general loosening in sheet availability. In **Pittsburgh**, consumer inventories on cold-rolled sheets have shown some improvement since the first of the year. Hot-rolled sheet inventories, however, are showing little improvement. Brokers and warehouses are still reported paying premium prices when necessary for hot-rolled sheets. For second quarter, consumers have somewhat better commitments from the mills for hot-rolled tonnages. One mill reports delivery times on hot-rolled sheets are being cut sufficiently to permit sales of this item in second quarter where none were made during first quarter. Cold-rolled sheet production from **Cleveland** mills is now going full blast with a minimum of difficulties reported from maintenance and other interruptions. The tightening up on order intake for the first quarter is now having an impact on carryover time. Mills say deliveries are just about current on this product. Hot-rolled strip in **Cleveland** has had a heavy pickup in customer demand because one major producer has dropped out of the picture and remaining companies are getting the business. And, in **Detroit**, customer demand for hot-rolled sheet is continuing at a brisk pace. There are some indications, however, that mills are catching up on their order backlogs for cold-rolled sheet. Automotive April ordering is good.

GALVANIZED . . . Both **Chicago** and **Cleveland** mills report capacity operations at present with little letup expected during the first half. A new Cleveland area mill turned in its best production month so far in January.

BARS . . . Most mills in the **Pittsburgh** area expect to be current or nearly so on bar deliveries by the end of the first quarter. Demand, mills point out, is still running heavily. The only reason, producers say, they expect to be current on deliveries is because earlier tonnage allocations to customers were very low over the past five months. Some automotive steel buyers have already told **Cleveland** bar producers that they expect to take full second quarter tonnages ordered earlier. In **Detroit** itself, carbon bars are still relatively hard to get hold of. Backlogs are so big, mills are still trying to catch up on deliveries. It's reported, however, that customer pressure for quick deliveries has eased somewhat. And, there's some feeling in **Chicago** that bars may follow the sheet pattern by loosening in March and April, despite little letup in customer calls for mill steel at present.

PLATES . . . In **Pittsburgh**, small consumers and those whose business doesn't permit steel ordering months in advance, are relying entirely on warehouses and brokers for plate tonnages. Little relief for these consumers is expected until plate mill expansion programs have been completed sometime beyond 1956. One **Detroit** mill says its second quarter plate order books are already filled, expects orders to remain well above "normal buying patterns" for the rest of the year.

STRUCTURALS . . . **Chicago** mills are sold out for the balance of the year on both wide-flange beams and standards. Little easing in consumer demand in virtually all other market areas is expected for the balance of 1956. Backstopping the looked for uninterruption in customer buying is the general nationwide continuance of strong highway building programs, and building construction activity.

WIRE PRODUCTS . . . Second quarter buying patterns are reportedly holding close to those of the first quarter in industrial and manufacturing wire products in the **Chicago** market. Farm grades, it's noted, are continuing to fluctuate in consumer purchase patterns, without a clear cut trend up or down to date. However, since jobber stocks are reported as low at present, some increase in demand for farm wire is expected to hit during early spring, the normal pickup period. Demand for spring wire and other manufacturing wire grades continues strong in **Detroit**. And, in **Cleveland**, welded wire fabric capacity will be expanded by 40,000 tons annually with construction of a new mill by American Steel & Wire Div., U. S. Steel. The new facility will turn out fabric wire up to 13 ft wide with patterns as small as 2 in. Thickness of wire handled will range from 0.135 to ½ in. Start of production is expected in a year.

Purchasing Agent's Checklist

PLASTICS: Industry weeds out weak sisters . . . . . p. 59

TOOLS: Portable type in market push . . . . . p. 61

ALUMINUM: Producers aim at oil country market . . . . . p. 67

ABRASIVES: Modern wheels simplify billet cutting . . . . . p. 99

Comparison of Prices

(Effective Feb. 14, 1956)

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Price advances over previous week are printed in Heavy Type; declines appear in *Italics*.

	Feb. 14 1956	Feb. 7 1956	Jan. 17 1956	Feb. 15 1955
Flat-Rolled Steel: (per pound)				
Hot-rolled Sheets	4.325¢	4.325¢	4.325¢	4.05¢
Cold-rolled sheets	5.325	5.325	5.325	4.95
Galvanized sheets (10 ga.)	5.85	5.85	5.85	5.45
Hot-rolled strip	4.325	4.325	4.325	4.05
Cold-rolled strip	6.29	6.29	6.29	5.79
Plate	4.52	4.52	4.52	4.225
Plates, wrought iron	10.40	10.40	10.40	9.30
Stainl's C-R strip (No. 302)	44.50	44.50	44.50	42.00
Tin and Terneplate: (per base box)				
Tinplate (1.50 lb.) cokes	$9.05	$9.05	$9.05	$9.05
Tinplate, electro (0.50 lb.)	7.75	7.75	7.75	7.75
Special coated mfg. ternes	7.85	7.85	7.85	7.85
Bars and Shapes: (per pound)				
Merchant bars	4.65¢	4.65¢	4.65¢	4.30¢
Cold finished bars	5.90	5.90	5.90	5.40
Alloy bars	5.65	5.65	5.65	5.075
Structural shapes	4.60	4.60	4.60	4.25
Stainless bars (No. 302)	38.25	38.25	38.25	35.50
Wrought iron bars	11.50	11.50	11.50	10.40
Wire: (per pound)				
Bright wire	6.25¢	6.25¢	6.25¢	5.75¢
Rails: (per 100 lb.)				
Heavy rails	$4.725	$4.725	$4.725	$4.45
Light rails	5.65	5.65	5.65	5.35
Semifinish Steel: (per net ton)				
Rerolling billets	$68.50	$68.50	$68.50	$64.00
Slabs, rerolling	68.50	68.50	68.50	64.00
Forging billets	84.50	84.50	84.50	78.00
Alloy blooms, billets, slabs	96.00	96.00	96.00	86.00
Wire Rod and Skelp: (per pound)				
Wire rods	5.025¢	5.025¢	5.025¢	4.675¢
Skelp	4.225	4.225	4.225	3.90
Finished Steel Composite: (per pound)				
Base price	5.174¢	5.174¢	5.174¢	4.797¢

	Feb. 14 1956	Feb. 7 1956	Jan. 17 1956	Feb. 15 1955
Pig Iron: (per gross ton)				
Foundry, del'd Phila.	$63.69	$63.69	$63.69	$61.19
Foundry, Valley	59.00	59.00	59.00	56.50
Foundry, Southern Cin'ti	62.93	62.93	62.93	60.43
Foundry, Birmingham	55.00	55.00	55.00	52.88
Foundry, Chicago	59.00	59.00	59.00	56.50
Basic, del'd Philadelphia	62.77	62.77	62.77	60.27
Basic, Valley furnace	58.50	58.50	58.50	56.00
Malleable, Chicago	59.00	59.00	59.00	56.50
Malleable, Valley	59.00	59.00	59.00	56.50
Ferromanganese‡, cents per lb.	9.50¢	9.50¢	9.50¢	9.50¢
‡ 74.76 pct Mn base.				
Pig Iron Composite: (per gross ton)				
Pig Iron	$59.09	$59.09	$59.09	$56.59
Scrap: (per gross ton)				
No. 1 steel, Pittsburgh	$49.50	$49.50	$54.50	$38.50
No. 1 steel, Phila. area	*51.00*	51.50	55.50	37.00
No. 1 steel, Chicago	*46.50*	47.50	49.50	33.50
No. 1 bundles, Detroit	44.50	44.50	47.50	29.00
Low phos., Youngstown	54.50	54.50	56.50	36.50
No. 1 mach'y cast, Pittsburgh	55.50	55.50	55.50	43.50
No. 1 mach'y cast, Philadel'a	54.50	54.50	57.50	43.50
No. 1 mach'y cast, Chicago	*51.50*	52.50	55.00	45.00
Steel Scrap Composite: (per gross ton)				
No. 1 heavy melting scrap	*$49.00*	$49.50	$53.17	$36.33
Coke, Connellsville: (per net ton at oven)				
Furnace coke, prompt	$14.25	$14.25	$14.25	$14.38
Foundry coke, prompt	16.25	16.25	16.25	16.75
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electrolytic, Conn.	$43.00	$43.00	$43.00	$33.00
Copper, Lake, Conn.	43.00	43.00	43.00	33.00
Tin, Straits, New York	99.50†	99.00	104.50	90.125
Zinc, East St. Louis	13.50	13.50	13.50	11.50
Lead, St. Louis	15.80	15.80	15.80	14.80
Aluminum, virgin ingot	24.40	24.40	24.40	23.20
Nickel, electrolytic	64.50	64.50	64.50	67.67
Magnesium, ingot	33.25	33.25	33.25	27.75
Antimony, Laredo, Tex.	33.00	33.00	33.00	28.50

† Tentative. ‡ Average. * Revised.

Finished Steel Composite

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

Pig Iron Composite

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

Steel Scrap Composite

Average of No. 1 heavy melting steel scrap delivered to consumers at Pittsburgh, Philadelphia and Chicago.

PIG IRON

Dollars per gross ton, f.o.b., subject to switching charges.

←To identify producers, see Key on P. 168→

Producing Point	Basic	Fdry.	Mall.	Bess.	Low Phos.
Bethlehem *B3*	60.50	61.00	61.50	62.00	.....
Birdsboro, Pa. *B6*	60.50	61.00	61.50	62.00	.....
Birmingham *R3*	54.50	55.00*	.....	.....	.....
Birmingham *W9*	54.50	55.00*	59.00	.....	.....
Birmingham *U4*	54.50	55.00*	59.00	.....	.....
Buffalo *R3*	58.50	59.00	59.50	60.00	.....
Buffalo *H1*	58.50	59.00	59.50	.....	.....
Buffalo *W6*	58.50	59.00	59.50	60.00	.....
Chester *C17*	60.50	61.00	61.50	.....	.....
Chicago *I4*	58.50	59.00	59.00	59.50	.....
Cleveland *A5*	58.50	59.00	59.00	59.50	63.50
Cleveland *R3*	58.50	59.00	59.00	59.50	.....
Duluth *I4*	58.50	59.00	59.00	59.50	.....
Erie *I4*	58.50	59.00	59.00	59.50	.....
Everett *M6*	.....	62.50	63.00	.....	.....
Fontana *K1*	64.50	65.00	.....	.....	.....
Geneva, Utah *C7*	58.50	59.00	.....	.....	.....
Granite City *G2*	60.40	60.90	61.40	.....	.....
Hubbard *Y1*	.....	.....	59.00	.....	.....
Lone Star *L3*	.....	55.00	.....	.....	.....
Midland *C11*	58.50	.....	.....	.....	.....
Minnequa *C6*	60.50	61.00	61.50	.....	.....
Monessen *P6*	58.50	.....	.....	.....	.....
Neville Is. *P4*	58.50	59.00	59.00	.....	.....
N. Tonawanda *T1*	.....	59.00	59.50	.....	.....
Pittsburgh *U1*	58.50	.....	.....	59.50	.....
Sharpsville *S3*	58.50	59.00	59.00	59.50	.....
So. Chicago *R3*	58.50	.....	59.00	.....	.....
Steelton *B3*	60.50	61.00	61.50	62.00	66.50
Swedeland *A2*	60.50	61.00	61.50	62.00	.....
Toledo *I4*	58.50	59.00	59.00	59.50	.....
Troy, N. Y. *R3*	60.50	61.00	61.50	62.00	66.50
Youngstown *Y1*	.....	.....	59.00	59.50	.....

DIFFERENTIALS: Add, 50¢ per ton for each 0.25 pct silicon or portion thereof over base (1.75 to 2.25 pct except low phos., 1.75 to 2.00 pct) 50¢ per ton for each 0.50 pct manganese or portion thereo over 1 pct, $2 per ton for 0.5 to 1.75 pct nickel, $1 for each additional, 0.25 pct nickel. * Add $1.00 for 0.31-0.69 pct phos.

Silvery Iron Buffalo, *H1*, $68.75; Jackson, *J1, G1*, $67.50. Add $1.00 per ton for each 0.50 pct silicon over base (6.01 to 6.50 pct) up to 17 pct. Add 75¢ for each 0.50 pct manganese over 1.0 pct. Bessemer ferrosilicon prices are $1 over comparable silvery iron.

STAINLESS STEEL

Base price cents per lb. f.o.b. mill

Product	301	302	303	304	316	321	348	410	416	430
Ingots, rerolling	17.75	19.00	—	20.25	31.50	25.00	33.75	15.00	—	15.25
Slabs, billets, rerolling	22.25	24.75	26.75	26.00	40.25	32.00	43.00	19.50	—	19.75
Forg. discs, die blocks, rings	—	—	—	—	—	—	—	—	—	—
Billets, forging	31.75	32.00	34.75	33.75	51.25	38.25	51.00	25.50	26.00	26.00
Bars, wires, structurals	38.00	38.25	41.00	40.25	60.75	45.25	60.00	30.50	31.00	31.00
Plates	40.00	40.25	42.75	43.00	64.00	49.25	64.75	31.75	32.25	32.25
Sheets	44.25	44.50	52.25	47.25	68.25	54.25	73.50	36.25	—	36.75
Strip, hot-rolled	32.00	34.50	—	37.25	58.25	44.25	50.75	—	—	—
Strip, cold-rolled	41.00	44.50	—	47.25	68.25	54.25	73.50	36.25	—	36.75

STAINLESS STEEL PRODUCING POINTS:

Sheets: Midland, Pa., *C11;* Brackenridge, Pa., *A3;* Butler, Pa., *A7;* McKeesport, Pa., *U1;* Washington, Pa., *W2, J2;* Baltimore, *E1;* Middletown, O., *A7;* Massillon, O., *R3;* Gary, *U1;* Bridgeville, Pa., *U2;* New Castle, Ind., *I2;* Ft. Wayne, *J4;* Philadelphia, *D5.*

Strip: Midland, Pa., *C11;* Cleveland, *A5;* Carnegie, Pa., *S9;* McKeesport, Pa., *F1;* Reading, Pa., *C2;* Washington, Pa., *W2;* W. Leechburg, Pa., *A3;* Bridgeville, Pa., *U2;* Detroit, *M2;* Canton-Massillon, O., *R3;* Middletown, O., *A7;* Harrison, N. J., *D3;* Youngstown, *C5;* Sharon, Pa., *S1;* Butler, Pa., *A7;* Wallingford, Conn., *U3* (.25¢ per lb higher); *W1* (.25¢ per lb higher); New Bedford, Mass., *R6.*

Bar: Baltimore, *A7;* Duquesne, Pa., *U1;* Munhall, Pa., *U1;* Reading, Pa., *C2;* Titusville, Pa., *U2;* Washington, Pa., *J2;* McKeesport, Pa., *U1, F1;* Bridgeville, Pa., *U2;* Dunkirk, N. Y., *A3;* Massillon, O., *R3;* Chicago, *U1;* Syracuse, N. Y., *C11;* Watervliet, N. Y., *A3;* Waukegan, *A5;* Canton, O., *T5;* Ft. Wayne, *I4;* Philadelphia, *D5;* Detroit, *R5.*

Wire: Waukegan, *A5;* Massillon, O., *R3;* McKeesport, Pa., *F1;* Ft. Wayne, *J4;* Harrison, N. J., *D3;* Baltimore, *A7;* Dunkirk, *A3;* Monessen, *P1;* Syracuse, *C11;* Bridgeville, *U2.*

Structurals: Baltimore, *A7;* Massillon, O., *R3;* Chicago, Ill., *J4;* Watervliet, N. Y., *A3;* Syracuse, *C11.*

Plates: Brackenridge, Pa., *A3;* Chicago, *U1;* Munhall, Pa., *U1;* Midland, Pa., *C11;* New Castle, Ind., *I2;* Middletown, *A7;* Washington, Pa., *J2;* Cleveland, Massillon, *R3;* Coatesville, Pa., *C15;* Philadelphia, *D5.*

Forged discs, die blocks, rings: Pittsburgh, *C11;* Syracuse, *C11;* Ferndale, Mich., *A3;* Washington, Pa., *J2.*

Forgings billets: Midland, Pa., *C11;* Baltimore, *A7;* Washington, Pa., *J2;* McKeesport, *F1;* Massillon, Canton, O., *R3;* Watervliet, *A3;* Pittsburgh, Chicago, *U1;* Syracuse, *C11;* Detroit, *R5.*

More Price Softenings Show Up

Steelmaking grades ease by $1 in Chicago, are off $1 on low side in Philadelphia . . . Top grades in Pittsburgh hold firm . . . Composite dips 50¢ to $49 level.

◆ THE GENERALLY SOFTER undertone of the market which has prevailed for the past several weeks is again in evidence this week.

In Pittsburgh, a small tonnage of No. 1 heavy melting moved at $48.00, but the real market test was expected next week.

In Chicago, in the absence of new mill buying, prices eased by another $1 in steelmaking and most other grades. Speculative buying seems to be increasing slightly, arguing for an expected upturn at the end of the month.

And in Philadelphia, in the face of generally quiet market activity and the lack of new mill purchases, prices eased off $1 on the low side in steelmaking grades. Other softenings were reported in blast furnace grades, low phos, railroad specialties, and heavy breakable cast.

New York prices continue to hold to earlier listings, though some brokers admit that mill orders have been small recently. Substantial export business, it's conceded, continues to bolster this market.

In most other districts, prices of top grades have either shown some additional softening or else are holding to earlier levels in the absence of new market activity.

On the basis of the latest falloff in steelmaking prices in Chicago and Philadelphia, THE IRON AGE scrap composite dipped to $49.00.

Pittsburgh . . . The market is generally stable with a $1 to $2 fall off in RR scrap prices as a result of the latest RR lists. This puts RR scrap more nearly in line with other steelmaking grades which had weakened considerably over the past several weeks. No big business is reported, but some sources expect new mill purchases before the end of the month. Dealer scrap is reported plentiful.

Chicago . . . In an absence of new mill buying, prices slipped another $1, and broker buying prices continue to move down. Heavy tonnages of scrap continue to move at previous prices, and speculative buying seems to be increasing slightly, arguing for an expected upturn at the end of the month. Factory bundles continue fairly strong and railroad heavy melting is continuing to hold despite repeated mill offers to buy at a lower price. Turnings, which had tightened a week ago, began flowing freely during the past week. Mill offers to buy in railroad grades and in several of the steelmaking grades have run as low as $2 beneath the bottom of the spread.

Philadelphia . . . In the absence of new mill buying prices eased off $1 on the low side in steelmaking grades. Easier prices are also reflected in blast furnace listings, off $1. Scattered softenings are also reported in low phos, the railroad specialties, and heavy breakable cast.

New York . . . Leading brokers in this area insist they will buy substantial tonnages at going IRON AGE prices. They admit domestic mill tonnages have been small in recent weeks, but stress export business continues to bolster this market.

Detroit . . . Although the market is marking time this week, indications are that it still has not settled on a firm basis. No new buying has been reported since the latest decline in prices. One broker is stockpiling scrap on the dock here for sale to a Canadian mill when the water shipping season opens.

Cleveland . . . The Valley market showed signs of strength with 3 production and railroad scrap purchases at $54, but a small amount of dealer tonnage went to $52, the same week. The Valley still has underlying strength because of low dealer inventories and fall-off in scrap from auto stamping plants. Cleveland market shipments against an old order of $51 from restricted yards continue strong. A second Cleveland mill has good inventory of high quality scrap. Foundry market continued somewhat weaker in Cleveland with small automotive purchase of 2 ft foundry steel at $55. Cut structural and plate showed weakness because of this small purchase and dropped $3. Rail crops have also dropped up to $4 on some grades.

Birmingham . . . With absence of openhearth buying in this district and one of the largest consumers restricting shipments, most brokers are virtually out of orders for these grades. No. 2 bundles are again a drag on the market. Electric furnace grades are still being bought, but foundries are purchasing only limited tonnages.

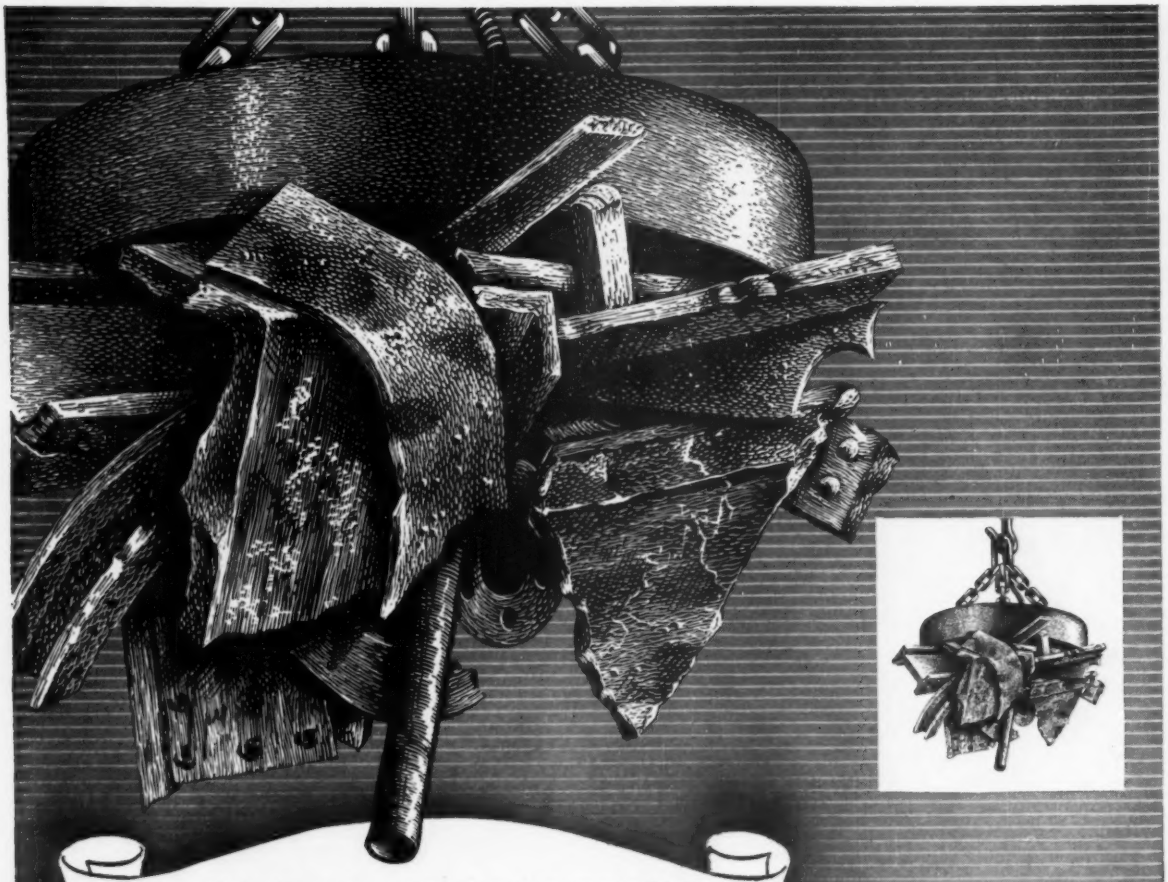
St. Louis . . . Scrap prices are off from $1 to $3 per ton as consumers' inventories increase and in line with weakness in other markets. The flow of material continues good and weather conditions in the area have not interfered with collection or processing.

Cincinnati . . . Cincinnati price on top grades was off $1 and secondary grades were $1.50 weaker as a local mill continued to stay out of the market. Shipments at old prices to a fringe area consumer are nearing an end with no new purchase in sight until the end of the month. Some dealers are making distress sales upriver and as far as the Mahoning Valley for as low as $40 on cars in Cincinnati.

Buffalo . . . The market is holding its own in Buffalo following a $3 drop last week. The only sales made were outside the district.

Boston . . . The market here is extremely quiet. Export is at a standstill. Domestic buying is off. The only price activity was in unstripped motor blocks, which were nominally pegged at $24 to $25.

West Coast . . . Prices are holding at present levels. In the face of a weakening export market, mills are limiting their buying.



A SYMBOL OF LEADERSHIP IN IRON & STEEL SCRAP SINCE 1889

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PHILADELPHIA NATIONAL BANK BLDG.
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DETROIT, MICH.		MONTREAL, CANADA

EXPORTS-IMPORTS **LIVINGSTON & SOUTHARD, INC.** 99 Park Ave., New York, N. Y. *Cable Address:* FORENTRACO

Scrap Prices *(Effective Feb. 14, 1956)*

Pittsburgh

No. 1 hvy. melting	$49.00 to $50.00
No. 2 hvy. melting	43.00 to 44.00
No. 1 bundles	49.00 to 50.00
No. 2 bundles	40.00 to 41.00
Machine shop turn	33.00 to 34.00
Mixed bor. and ms. turn	33.00 to 34.00
Shoveling turnings	36.00 to 37.00
Cast iron borings	36.00 to 37.00
Low phos. punch'gs plate	56.00 to 57.00
Heavy turnings	44.00 to 45.00
No. 1 RR. hvy. melting	54.00 to 55.00
Scrap rails, random lgth.	62.00 to 63.00
Rails 2 ft and under	67.00 to 68.00
RR. steel wheels	59.00 to 60.00
RR. spring steel	59.00 to 60.00
RR. couplers and knuckles	59.00 to 60.00
No. 1 machinery cast	55.00 to 56.00
Cupola cast	48.00 to 49.00
Heavy breakable cast	45.00 to 46.00

Chicago

No. 1 hvy. melting	$46.00 to $47.00
No. 2 hvy. melting	37.00 to 38.00
No. 1 factory bundles	50.00 to 51.00
No. 1 dealers' bundles	47.00 to 48.00
No. 2 dealers' bundles	37.00 to 38.00
Machine shop turn	26.00 to 27.00
Mixed bor. and turn	28.00 to 29.00
Shoveling turnings	28.00 to 29.00
Cast iron borings	28.00 to 29.00
Low phos. forge crops	56.00 to 57.00
Low phos. punch'gs plate	53.00 to 54.00
Low phos. 3 ft and under	52.00 to 53.00
No. 1 RR. hvy. melting	51.00 to 52.00
Scrap rails, random lgth	60.00 to 61.00
Rerolling rails	66.00 to 67.00
Rails 2 ft and under	65.00 to 66.00
Locomotive tires, cut	55.00 to 56.00
Cut bolsters & side frames	56.00 to 57.00
Angles and splice bars	63.00 to 64.00
RR. steel car axles	63.00 to 64.00
RR. couplers and knuckles	56.00 to 57.00
No. 1 machinery cast	51.00 to 52.00
Cupola cast	48.00 to 49.00
Heavy breakable cast	40.00 to 41.00
Cast iron brake shoes	37.00 to 38.00
Cast iron car wheels	46.00 to 47.00
Malleable	58.00 to 59.00
Stove plate	39.00 to 40.00

Philadelphia Area

No. 1 hvy. melting	$50.00 to $52.00
No. 2 hvy. melting	43.00 to 45.00
No. 1 bundles	50.00 to 52.00
No. 2 bundles	40.00 to 42.00
Machine shop turn	35.00 to 36.00
Mixed bor. short turn	35.50 to 36.50
Cast iron borings	35.50 to 36.50
Shoveling turnings	38.00 to 39.00
Clean cast chem. borings	41.00 to 42.00
Low phos. 5 ft and under	54.00 to 56.00
Low phos. 2 ft and under	56.00 to 57.00
Low phos. punch'gs	56.00 to 57.00
Elec. furnace bundles	53.00 to 54.00
Heavy turnings	47.00 to 48.00
RR. steel wheels	58.00 to 59.00
RR. spring steel	58.00 to 59.00
Rails 18 in. and under	65.00 to 67.00
Cupola cast	49.00 to 50.00
Heavy breakable cast	52.00 to 53.00
Cast iron car wheels	58.00 to 59.00
Malleable	66.50 to 67.50
Unstripped motor blocks	38.00 to 39.00
No. 1 machinery cast	54.00 to 55.00

Cleveland

No. 1 hvy. melting	$50.00 to $51.00
No. 2 hvy. melting	44.00 to 45.00
No. 1 bundles	50.00 to 51.00
No. 2 bundles	39.00 to 40.00
No. 1 busheling	50.00 to 51.00
Machine shop turn.	29.00 to 30.00
Mixed bor. and turn.	33.00 to 34.00
Shoveling turnings	33.00 to 34.00
Cast iron borings	33.00 to 34.00
Cut struct'r'l & plates, 2 ft & under	56.00 to 57.00
Drop forge flashings	50.00 to 51.00
Low phos. punch'gs, plate	50.50 to 51.50
Foundry steel, 2 ft & under	54.00 to 55.00
No. 1 RR. heavy melting	51.00 to 52.00
Rails 2 ft and under	67.00 to 68.00
Rails 18 in. and under	68.00 to 69.00
Railroad grate bars	40.00 to 41.00
Steel axle turnings	34.00 to 35.00
Railroad cast	57.00 to 58.00
No. 1 machinery cast	52.00 to 53.00
Stove plate	52.00 to 53.00
Malleable	58.00 to 59.00

Iron and Steel Scrap

Going prices of iron and steel scrap as obtained in the trade by THE IRON AGE based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

Youngstown

No. 1 hvy. melting	$52.00 to $53.00
No. 2 hvy. melting	41.00 to 42.00
No. 1 bundles	52.00 to 53.00
No. 2 bundles	40.00 to 41.00
Machine shop turn.	29.00 to 30.00
Shoveling turnings	33.00 to 34.00
Cast iron borings	33.00 to 34.00
Low phos. plate	54.00 to 55.00

Buffalo

No. 1 hvy. melting	$45.00 to 46.00
No. 2 hvy. melting	39.00 to 40.00
No. 1 busheling	45.00 to 46.00
No. 1 bundles	45.00 to 46.00
No. 2 bundles	35.00 to 36.00
Machine shop turn.	27.00 to 28.00
Mixed bor. and turn.	28.00 to 29.00
Shoveling turnings	29.00 to 30.00
Cast iron borings	29.00 to 30.00
Low phos. plate	54.00 to 55.00
Scrap rails, random lgth.	51.00 to 52.00
Rails 2 ft and under	65.00 to 66.00
RR. steel wheels	55.00 to 56.00
RR. spring steel	55.00 to 56.00
RR. couplers and knuckles	55.00 to 56.00
No. 1 machinery cast	52.00 to 53.00
No. 1 cupola cast	48.00 to 49.00

Detroit

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$44.00 to $45.00
No. 2 hvy. melting	32.00 to 33.00
No. 1 bundles, openhearth	44.00 to 45.00
No. 2 bundles	32.00 to 33.00
New busheling	44.00 to 45.00
Drop forge flashings	43.50 to 44.50
Machine shop turn.	20.00 to 21.00
Mixed bor. and turn.	23.00 to 24.00
Shoveling turnings	23.00 to 24.00
Cast iron borings	23.00 to 24.00
Low phos. punch'gs, plate	45.00 to 46.00
No. 1 cupola cast.	44.00 to 45.00
Heavy breakable cast	37.00 to 38.00
Stove plate	38.00 to 39.00
Automotive cast.	48.00 to 49.00

St. Louis

No. 1 hvy. melting	$40.50 to $41.50
No. 2 hvy. melting	37.00 to 38.00
No. 1 bundles	40.50 to 41.50
No. 2 bundles	32.00 to 33.00
Machine shop turn.	26.00 to 27.00
Cast iron borings	28.00 to 29.00
Shoveling turnings	30.00 to 31.00
No. 1 RR. hvy. melting	47.00 to 48.00
Rails, random lengths	55.00 to 56.00
Rails 18 in. and under	62.00 to 63.00
Locomotive tires uncut	53.00 to 54.00
Angles and splice bars	53.00 to 54.00
Std. steel car axles	58.00 to 59.00
RR. specialties	53.00 to 54.00
Cupola cast	47.00 to 48.00
Heavy breakable cast.	37.00 to 38.00
Cast iron brake shoes	37.00 to 38.00
Stove plate	38.00 to 39.00
Cast iron car wheels	44.00 to 45.00
Rerolling rails	63.00 to 64.00
Malleable	50.00 to 51.00
Unstripped motor blocks	37.00 to 38.00

Boston

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$41.00 to 41.50
No. 2 hvy. melting	32.00 to 33.00
No. 1 bundles	41.00 to 41.50
No. 2 bundles	31.00 to 31.50
No. 1 busheling	41.00 to 41.50
Elec. furnace, 3 ft & under	42.00 to 43.00
Machine shop turn.	26.00 to 26.50
Mixed bor. and short turn.	27.00 to 28.00
Shoveling turnings	29.00 to 29.50
Clean cast chem. borings	27.00 to 28.00
No. 1 machinery cast.	44.50 to 45.50
Mixed cupola cast.	39.00 to 40.00
Heavy breakable cast.	41.00 to 42.00
Stove plate	37.00 to 38.00
Unstripped motor blocks	24.00 to 25.00

New York

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$44.00 to $45.00
No. 2 hvy. melting	39.00 to 40.00
No. 2 bundles	32.00 to 33.00
Machine shop turn.	25.00 to 26.00
Mixed bor. and turn.	25.00 to 26.00
Shoveling turnings	26.00 to 27.00
Clean cast chem. borings	32.00 to 33.00
No. 1 machinery cast	49.00 to 50.00
Mixed yard cast	46.00 to 47.00
Charging box cast	46.00 to 47.00
Heavy breakable cast	46.00 to 47.00
Unstripped motor blocks	31.00 to 32.00

Birmingham

No. 1 hvy. melting	$41.00 to 42.00
No. 2 hvy. melting	39.00 to 40.00
No. 1 bundles	41.00 to 42.00
No. 2 bundles	30.00 to 31.00
No. 1 busheling	41.00 to 42.00
Machine shop turn.	29.00 to 30.00
Shoveling turnings	30.00 to 31.00
Cast iron borings	19.00 to 20.00
Electric furnace bundles	46.00 to 47.00
Bar crops and plate	51.00 to 52.00
Structural and plate, 2 ft	51.00 to 52.00
No. 1 RR. hvy. melting	49.00 to 50.00
Scrap rails, random lgth.	58.00 to 59.00
Rails, 18 in. and under	63.00 to 64.00
Angles & splice bars	57.00 to 58.00
Rerolling rails	62.00 to 63.00
No. 1 cupola cast.	47.50 to 48.50
Stove plate	46.00 to 47.00
Charging box cast.	32.00 to 33.00
Cast iron car wheels	39.00 to 40.00
Unstripped motor blocks	39.00 to 40.00
Mashed tin cans	15.00 to 16.00

Cincinnati

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$45.00 to $46.00
No. 2 hvy. melting	38.00 to 39.00
No. 1 bundles	45.00 to 46.00
No. 2 bundles	36.00 to 37.00
Machine shop turn.	30.00 to 31.00
Mixed bor. and turn.	30.00 to 31.00
Shoveling turnings	33.00 to 34.00
Cast iron borings	30.00 to 31.00
Low phos. 18 in. & under	53.00 to 54.00
Rails, random lengths	58.00 to 59.00
Rails, 18 in. and under	65.00 to 66.00
No. 1 cupola cast.	45.00 to 46.00
Hvy. breakable cast.	42.00 to 43.00
Drop broken cast.	54.00 to 55.00

San Francisco

No. 1 hvy. melting	$40.00
No. 2 hvy. melting	35.00
No. 1 bundles	39.00
No. 2 bundles	32.00
No. 3 bundles	25.00
Machine shop turn	$20.00 to 23.00
Cast iron borings	20.00
No. 1 RR. hvy. melting	40.00
No. 1 cupola cast.	50.00

Los Angeles

No. 1 hvy. melting	$42.00
No. 2 hvy. melting	36.00
No. 1 bundles	39.00
No. 2 bundles	32.00
No. 3 bundles	25.00
Machine shop turn.	18.00
Shoveling turnings	21.00
Cast iron borings	18.00
Elec. furn. 1 ft and under	42.00
No. 1 RR. hvy. melting	42.00
No. 1 cupola cast.	46.00

Seattle

No. 1 hvy. melting	$42.00
No. 2 hvy. melting	38.00
No. 2 bundles	32.00
No. 3 bundles	25.00
No. 1 cupola cast.	45.00
Mixed yard cast.	45.00

Hamilton, Ont.

No. 1 hvy. melting	$45.50
No. 2 hvy. melting	41.50
No. 1 bundles	45.50
No. 2 bundles	38.00
Mixed steel scrap	39.50
Bushelings	35.50
Bush., new fact., prep'd	43.50
Bush., new fact., unprep'd.	39.50
Machine shop turn.	18.00
Short steel turn.	27.50
Mixed bor. and turn.	$16.00 to 19.00
Rails, rerolling	53.50
Cast scrap	42.00 to 45.00

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Strikes Still Dominate Copper

Laurel Hill refinery of Phelps Dodge resumes full production . . . But Kennecott's Nevada operations halted by strike . . . 20,000 tons lost already in 1956

◆ STRIKES continue to be the dominating factor in the copper market. A day hasn't passed in 1956 that copper output wasn't threatened in some manner by labor disputes. And there's no change in the labor climate in sight.

The strike at the Laurel Hill, N. Y., refinery of the Phelps Dodge Refining Corp. was ended by verbal agreement last week, with workers back at their jobs before signed agreements had been received by the company.

But a day before the Laurel Hill strike ended, Kennecott Corp. reported that its Nevada operations were completely paralyzed by a strike affecting the mine at Ruth and the smelter at McGill.

Thus far this year strikes have cost the industry more copper than it could afford to lose under current tight market conditions. The strike in Chile holding over from 1955 cost a total of 31,000 tons, probably a fourth of this loss occuring in 1956. Laurel Hill's dispute cost another 12,000 tons. Kennecott's Nevada strike will probably mean another 1000 tons lost.

This amounts to a loss of over 20,000 tons already this year, about 25 pct of the total copper production lost in 1955 because of labor trouble. And there are still 10 months to go.

The Laurel Hill refinery was shut down for over a month, accounting for the loss of 12,000 tons of production. But in spite of the long time out, workers are going back to work on virtually the same basis as they left. Wages and benefits generally are not altered. Some reports indicate they were not at issue.

Because of the holiday early this week, Kennecott officials were not available to comment on the strike potential. It was understood that the local union of the International Mine, Mill and Smelter Workers objected to an experiment in either mine or mill and issued the strike order to enforce its position. About 2000 men are affected. Output is 4000 tons of copper per month.

It was not generally expected that the work stoppage would last long enough to hurt production to any degree. Management - labor agreement was expected in a week or so. However, calling copper labor shots is hazardous. The Laurel Hill strike, for example, was expected to end in a matter of days.

Looking ahead, more labor trouble looms on the horizon. At the American Brass Co. plants at Torrington and Ansonia, Conn., and Buffalo, the UAW-CIO is set to challenge the right to bargain of the Mine, Mill and Smelter Workers at each of these plants. In effect, there are three different local unions being challenged. However, because they bargain as a unit, they stand or fall together.

This will be the fourth time the battle for control will be waged. It should be the most active, considering the added strength of the challenging union. Current contracts between management and the independent unions do not expire until June 30. However, the battle for control could cause periodic production interruptions until the issue is settled.

ZINC and LEAD . . . A bill is now before the U. S. Senate, S 3173 authored by Sen. Carlson (Rep., Kan.), to permit the government to buy lead and zinc at a premium price during a national emergency. Benefiting under this act would be operators of marginal lead and zinc mines whose metal would be necessary and possibly critical but who could not operate at a profit under the prevailing market prices.

General Services Administration would be the government agency with the power to select sources, set the price and make the purchase. All ore procured in this manner would of necessity go into the stockpile.

TIN . . . With government stockpiling slowly drawing to a close, there is considerable conjecture on the state of the tin market after its biggest customer becomes idle. Things may not be as rosy as many tin fabricators and consumers think. Three of the major tin producers have considerable latitude in their operations. Because of economic setups, Indonesia, Belgian Congo and Bolivia can deliver a little or a lot of tin monthly. As long as the price stays up they will deliver a lot. But as the U. S. buys less and less, and the price starts to sink, they will begin producing less. Despite the fact that 1955 was a boom year, two of these countries, Indonesia and Bolivia, exported less tin than in 1954. Belgian Congo, sending a large portion of its production to Great Britain, increased its output — less than 500 tons. Despite the fact that the International Tin Agreement will soon go into effect, considerable fluctuation can be expected in price and supply-and-demand balance as these countries try to anticipate stockpile buying intensity. Lively action will probably continue to mark the tin market, although fluctuations may be modified by government withdrawal.

Daily Nonferrous Metal Prices

(Cents per lb except as noted)

	Feb. 8	Feb. 9	Feb. 10	Feb. 11	Feb. 13	Feb. 14
Copper, electro, Conn.	43.00	43.00	43.00	....	43.00	43.00
Copper, Lake, delivered	43.00	43.00	43.00	....	43.00	43.00
Tin, Straits, New York	99.125	98.625	99.00	....	99.50	99.50*
Zinc, East St. Louis	13.50	13.50	13.50	13.50	13.50	13.50
Lead, St. Louis	15.80	15.80	15.80	15.80	15.80	15.80

Note: Quotations are going prices. **Tentative*

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Nonferrous Prices *(Effective Feb. 14, 1956)*

MILL PRODUCTS

(Cents per lb, unless otherwise noted)

Aluminum

(Base 30,000 lb, f.o.b. ship. pt., frt. allowed)

Flat Sheet (Mill Finish) and Plate

("F" temper except 6061-0)

Alloy	.032	.081	.136–.249	.250–3.
1100, 3003	40.8	38.7	37.5	36.5
5052	48.3	43.4	41.7	39.9
6061-0	45.4	41.2	39.4	39.3

Extruded Solid Shapes

Factor	6063 T-5	6062 T-6
6–8	41.6–43.3	56.6–60.2
12–14	42.3–43.7	57.5–61.8
24–26	45.3–45.7	67.7–72.1
36–38	53.6–54.2	90.5–94.3

Screw Machine Stock—2011-T-3

Size"	¼	⅜–⅝	¾–1	1¼–1½
Price	54.5	53.4	52.1	50.1

Roofing Sheet, Corrugated

(Per sheet, 26" wide, base, 16,000 lb)

Length" →	72	96	120	144
.019 gage	$1.295	$1.727	$2.160	$2.590
.024 gage	1.615	2.162	2.692	3.232

Magnesium

(F.o.b. mill, freight allowed)

Sheet & Plate: FS1-O ¼ in., 61¢; 3/16 in., 62¢; ½ in., 61¢; 0.064 in., 78¢; 0.032 in., 99¢. Specification grade higher. Base, 30,000 lb.

Extruded Round Rod: FS, diam ¼ to 0.311 in., 82.5¢; ½ to ¾ in., 65¢; 1¼ to 1.749 in., 60.5¢; 2½ to 5 in., 57¢. Other alloys higher. Base up to ¾ diam, 10,000 lb; ¾ to 2 in., 20,000 lb; 2 in. and larger, 30,000 lb.

Extruded Solid Shapes: Rectangles: FS. In weight per ft for perimeters less than size indicated: 0.10 to 0.11 lb, 3.5 in., 70.7¢; 0.22 to 0.25 lb, 5.9 in., 66.9¢; 0.50 to 0.59 lb, 8.6 in., 63¢; 1.8 to 2.59 lb, 19.5 in., 60.8¢; 4 to 6 lb, 28 in., 57.7¢. Other alloys higher. Base, in weight per ft of shape: Up to ½ lb, 10,000 lb; ½ to 1.80 lb, 20,000 lb; 1.80 lb and heavier, 30,000 lb.

Extruded Round Tubing: FS, 0.049 to 0.057 in. wall thickness: OD ¼ to 5/16 in., $1.625; 5/16 to ⅜ in., $1.475; ½ to ⅝ in., $1.105; 1 to 2 in., 92.5¢; 0.165 to 0.219 in. wall: OD ⅜ to ⅝ in., 75.5¢; 1 to 2 in., 71.5¢; 3 to 4 in., 70.5¢. Other alloys higher. Base OD: Up to 1½ in., 10,000 lb; 1½ to 3 in., 20,000 lb; over 3 in., 30,000 lb.

Copper, Brass, Bronze

(Freight included on 500 lb)

	Sheet	Rods	Extruded Shapes
Copper	63.13	...	63.48
Copper, h-r	58.76	59.11	....
Copper, drawn	....	60.36	....
Low brass	57.75	58.29	....
Yellow brass	53.60	53.54	....
Red brass	59.24	59.18	....
Naval brass	52.83	51.41	48.40
Leaded brass	....	....	48.42
Com. bronze	61.28	61.82	....
Mang. bronze	59.39	53.38	54.94
Phos. bronze	82.51	81.50	....
Muntz metal	53.74	49.55	50.80
Ni silver 10 pct	66.00	68.33	70.68

Beryllium copper Cr, 1.9% Be, Base 2000 lb, f.o.b.

Strip	$1.84
Rod, bar, wire	1.81

Nickel, Monel, Inconel

(Base prices, f.o.b. mill)

	"A" Nickel	Monel	Inconel
Sheet, CR	102	83	99
Strip, CR	102	92	125
Rod, Bar, HR	87	74	93
Angles, HR	87	74	93
Plate, HR	97	87	95
Seamless Tube	122	110	153
Shot, Blocks	....	71	...

Titanium

(10,000 lb base, f.o.b. mill)

Sheet and strip, commercially pure, $13.10-$13.60; alloy $15.25-$15.75; Plate, HR, commercially pure, $10.50-$11.00; alloy, $11.50-$12.00. Wire, rolled and/or drawn, commercially pure, $9.50-$11.50; alloy, $11.50; Bar, HR or forged, commercially pure, $7.90-$8.15; alloy, $7.90-$8.10.

PRIMARY METAL

(Cents per lb, unless otherwise noted)

Aluminum ingot, 99+%, 10,000 lb. freight allowed	24.40
Aluminum pig	22.50
Antimony, American, Laredo, Tex.	33.50
Beryllium copper, per lb conta'd Be	$43.00
Beryllium aluminum 5% Be, Dollars per lb contained Be	$72.75
Bismuth, ton lots	$2.25
Cadmium, del'd	$1.70
Cobalt, 97-99% (per lb)	$2.60 to $2.67
Copper, electro, Conn. Valley	43.00
Copper, Lake, delivered	43.00
Gold, U. S. Treas., per troy oz.	$35.00
Indium, 99.9%, dollars per troy oz.	$2.25
Iridium, dollars per troy oz.	$100 to $120
Lead, St. Louis	15.80
Lead, New York	16.00
Magnesium, 99.8+%, f.o.b. Freeport, Tex., 10,000 lb, pig	32.50
ingot	33.25
Magnesium, sticks, 100 to 500 lb.	53.00
Mercury, dollars per 76-lb flask, f.o.b. New York	$270 to $274
Nickel electro	64.50
Nickel oxide sinter at Copper Cliff, Ont., contained nickel	60.75
Palladium, dollars per troy oz.	$23 to $24
Platinum, dollars per troy oz.	$97 to $107
Silver, New York, cents per troy oz.	90.75
Tin, New York	99.50*
Titanium sponge, grade A-1	$3.15 to $3.45
Zinc, East St. Louis	13.50
Zinc, New York	14.00
Zirconium, sponge	$10.00

* Tentative

REMELTED METALS

Brass Ingot

(Cents per lb delivered, carloads)

85-5-5-5 ingot	
No. 115	42.00
No. 120	41.25
No. 123	40.50
80-10-10 ingot	
No. 305	45.75
No. 315	44.00
88-10-2 ingot	
No. 210	58.25
No. 215	54.75
No. 245	48.75
Yellow ingot	
No. 405	33.25
Manganese bronze	
No. 421	37.75

Aluminum Ingot

(Cents per lb del'd 30,000 lb and over)

95-5 aluminum-silicon alloys	
0.30 copper max.	31.25-32.00
0.60 copper max.	31.00-31.75
Piston alloys (No. 122 type)	32.50-33.25
No. 12 alum. (No. 2 grade)	29.75-30.50
108 alloy	30.00-30.50
195 alloy	31.50-32.50
13 alloy (0.60 copper max.)	31.00-31.75
AXS-679	30.00-30.50

Steel deoxidizing aluminum, notch bar granulated or shot

Grade 1—95-97½%	30.00-31.00
Grade 2—92-95%	29.25-30.25
Grade 3—90-92%	28.50-29.50
Grade 4—85-90%	28.00-28.75

SCRAP METALS

Brass Mill Scrap

(Cents per pound, add 1¢ per lb for shipments of 20,000 lb and over)

	Heavy	Turnings
Copper	39	38¼
Yellow brass	29¼	27⅛
Red brass	34⅜	33⅜
Comm. bronze	35¾	35
Mang. bronze	27½	26¾
Yellow brass rod ends	29	....

Custom Smelters Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire	42½
No. 2 copper wire	41
Light copper	38½
*Refinery brass	38

* Dry copper content.

Ingot Makers Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire	42½
No. 2 copper wire	41
Light copper	38½
No. 1 composition	34½
No. 1 comp. turnings	34
Hvy. yellow brass solids	24½
Brass pipe	28
Radiators	27
Aluminum	
Mixed old cast	20 —21
Mixed new clips	21½—22
Mixed turnings, dry	20½—21

Dealers' Scrap

(Dealers' buying price, f.o.b. New York in cents per pound)

Copper and Brass

No. 1 heavy copper and wire	40 —40½
No. 2 heavy copper and wire	38 —38½
Light copper	36 —36½
New type shell cuttings	34½—35
Auto radiators (unsweated)	23½—24
No. 1 composition	31 —31½
No. 1 composition turnings	29 —29½
Unlined red car boxes	25 —25½
Cocks and faucets	24½—25
Clean heavy yellow brass	20 —20½
Brass pipe	25 —25½
New soft brass clippings	26 —26½
No. 1 brass rod turnings	23½—24

Aluminum

Alum. pistons and struts	18 —18½
Aluminum crankcases	16¾—17¼
1100 (2S) aluminum clippings	20½
Old sheet and utensils	16¾—17¼
Borings and turnings	11½—12
Industrial castings	16¾—17¼
2024 (24S) clippings	18½—19

Zinc

New zinc clippings	8½— 9
Old zinc	6 — 6½
Zinc routings	4¼
Old die cast scrap	3½

Nickel and Monel

Pure nickel clippings	$1.50
Clean nickel turnings	$1.25
Nickel anodes	$1.50
Nickel rod ends	$1.50
New Monel clippings	60
Clean Monel turnings	50
Old sheet Monel	55
Nickel silver clippings, mixed	25
Nickel silver turnings, mixed	21

Lead

Soft scrap lead	12½—13
Battery plates (dry)	6¾— 7
Batteries, acid free	4½

Magnesium

Segregated solids	18½—19
Castings	17½—18

Miscellaneous

Block tin	83 —84
No. 1 pewter	66 —67
Auto babbitt	43½—44½
Mixed common babbitt	15½
Solder joints	20 —20½
Siphon tops	50
Small foundry type	16¼—16½
Monotype	14¾—15¼
Lino. and stereotype	14 —14½
Electrotype	12¼—12¾
Hand picked type shells	10½—11
Lino. and stereo. dross	5¾— 6
Electro. dross	4¾— 5

STEEL PRICES

(Effective Feb. 14, 1956)

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BILLETS, BLOOMS, SLABS			PILING	SHAPES STRUCTURALS			STRIP					
		Carbon Rerolling Net Ton	Carbon Forging Net Ton	Alloy Net Ton	Sheet Steel	Carbon	Hi Str. Low Alloy	Carbon Wide-Flange	Hot-rolled	Cold-rolled	Hi Str. H.R. Low Alloy	Hi Str. C.R. Low Alloy	Alloy Hot-rolled	Alloy Cold-rolled
EAST	Bethlehem, Pa.			$96.00 *B3*		4.65 *B3*	6.80 *B3*	4.65 *B3*						
	Buffalo, N. Y.	$68.50 *B3*	$84.50 *R3, B3*	$96.00 *R3, B3*	5.45 *B3*	4.65 *B3*	6.80 *B3*	4.65 *B3*	4.325 *R3,B3*	6.25 *B3* 6.25 *R7,S10*	6.425 *B3*	9.10 *B3*		
	Claymont, Del.													
	Harrison, N. J.													13.45 *C11*
	Conshohocken, Pa.								4.375 *A2*	6.30 *A2*	6.425 *A2*			
	New Bedford, Mass.									6.70 *R6*				
	Johnstown, Pa.	$68.50 *B3*	$84.50 *B3*	$96.00 *B3*		4.65 *B3*	6.80 *B3*							
	Boston, Mass.									6.80 *T8*				13.80 *T8*
	New Haven, Conn.									6.70 *D1* *A5*				
	Phoenixville, Pa.					5.15 *P2*		5.15 *P2*						
	Sparrows Pt., Md.								4.325 *B3*	6.25 *B3*	6.425 *B3*	9.10 *B3*		
	Bridgeport, Wallingford, Conn.	$73.50 *N8*	$89.50 *N8*						4.625 *N8*	6.70 *W1*			7.50 *N8*	
	Pawtucket, R. I. Worcester, Mass.									6.80 *N7* *A5*				*A5* 13.80 *N7*
MIDDLE WEST	Alton, Ill.								4.50 *L1*					
	Ashland, Ky.								4.325 *A7*					
	Canton-Massillon, Dover, Ohio		$86.50 *R3*	$96.00 *R3*										13.45 *G4*
	Chicago, Ill.	$68.50 *U1*	$84.50 *R3, U1,W8*	$96.00 *R3, U1,W8*	5.45 *U1*	4.60 *U1, W8*	6.75 *U1, Y1*	4.60 *U1*	4.55 *A1* 4.325 *N4,W8*	6.35 *A1,T8*			7.20 *W8*	13.45 *T8*
	Cleveland, Ohio									6.25 *A5,J3*		9.30 *A5*		13.45 *A5*
	Detroit, Mich.			$96.00 *R5*					4.425 *G3,M2*	6.35 *D1,D2, G3,M2,P11*	6.525 *G3*	9.20 *D2, G3*		
	Duluth, Minn.													
	Gary, Ind. Harbor, Indiana	$68.50 *U1*	$84.50 *U1*	$96.00 *U1, Y1*	5.45 *I3*	4.60 *U1, I3*	6.75 *U1, I3*		4.325 *I3, U1,Y1*	6.35 *I3* 6.35 *Y1*	6.425 *I3, U1,Y1*	9.30 *Y1*	7.20 *Y1, U1*	
	Sterling, Ill.								4.425 *N4*					
	Indianapolis, Ind.									6.40 *C9*				
	Newport, Ky.												7.20 *N5*	
	Middletown, Ohio									6.45 *A7*				
	Niles, Warren, Ohio Sharon, Pa.	$68.50 *C10*	$84.50 *C10*	$96.00 *C10*					4.325 *S1, R3*	6.25 *S1, R3,T4*	6.425 *S1, R3*	9.10 *S1, R3*	7.20 *S1*	13.45 *S1*
	Pittsburgh, Pa. Midland, Pa. Butler, Pa.	$68.50 *U1, J3*	$84.50 *J3, U1,C11*	$96.00 *U1, C11*	5.45 *U1*	4.60 *U1, J3*	6.75 *U1, J3*	4.60 *U1*	4.325 *P6*	6.25 *S7,B4*			7.20 *S9*	13.45 *S9*
	Portsmouth, Ohio								4.325 *P7*					
	Weirton, Wheeling, Follansbee, W. Va.					4.60 *W3*			4.325 *W3*	6.25 *P3,W3*	6.425 *W3*	9.10 *W3*		
	Youngstown, Ohio		$84.50 *C10*	$96.00 *Y1, C10*		4.60 *Y1*	6.75 *Y1*		4.325 *U1, Y1*	6.25 *Y1,C3*	6.425 *U1, Y1*	9.30 *Y1*	7.20 *U1, Y1*	13.45 *C5*
WEST	Fontana, Cal.	$76.00 *K1*	$92.00 *K1*	$115.00 *K1*		5.25 *K1*	7.40 *K1*	5.40 *K1*	5.075 *K1*	8.00 *K1*	7.525 *K1*		8.85 *K1*	
	Geneva, Utah		$84.50 *C7*			4.60 *C7*	6.75 *C7*							
	Kansas City, Mo.					4.70 *S2*	6.85 *S2*				6.675 *S2*		7.45 *S2*	
	Los Angeles, Torrance, Cal.		$94.00 *B2*	$116.00 *B2*		5.30 *C7, B2*	7.45 *B2*		5.075 *C7, B2*	8.30 *C1*			8.40 *B2*	
	Minnequa, Colo.					4.90 *C6*			5.425 *C6*					
	Portland, Ore.					5.35 *O2*								
	San Francisco, Niles, Pittsburg, Cal.		$94.00 *B2*			5.25 *B2, P9*	7.40 *B2*		5.075 *B2, C7*					
	Seattle, Wash.		$98.00 *B2*			5.35 *B2*	7.50 *B2*		5.325 *B2*					
SOUTH	Atlanta, Ga.								4.525 *A9*					
	Fairfield, Ala. City, Birmingham, Ala.	$68.50 *T2*	$84.50 *T2*			5.10 *C16* 4.60 *R3,T2*	6.75 *T2*		4.325 *R3,T2* 4.425 *C16*		6.425 *T2*			
	Houston, Lone Star, Tex.	$74.50 *L3*	$89.50 *S2*	$101.00 *S2*		4.70 *S2*	6.85 *S2*				6.675 *S2*		7.45 *S2*	

IRON AGE

STEEL PRICES

(Effective Feb. 14, 1956)

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		SHEETS										WIRE ROD	TINPLATE†		BLACK PLATE
		Hot-rolled *18* ga. & hvyr.	Cold-rolled	Galvanized *10* ga.	Enameling *12* ga.	Long Terne *10* ga.	Hi Str. Low Alloy H.R.	Hi Str. Low Alloy C.R.	Hi Str. Low Alloy Galv.	Hot-rolled *19* ga.			Cokes* *1.25*-lb. base box	Electro* *0.25*-lb. base box	Hollowware Enameling *29* ga.
EAST	Bethlehem, Pa.												† Special coated mfg. terne deduct 50¢ from 1.25-lb. coke base box price. Can-making quality blackplate 55 to 128 lb. deduct $2.20 from 1.25-lb. coke base box. * COKES: 1.50-lb. add 25¢. ELECTRO: 0.50-lb. add 25¢; 0.75-lb. add 65¢; 1.00-lb. add $1.00. Differential 1.00 lb./0.25 lb. add 65¢.		
	Buffalo, N. Y.	4.325 *B3*	5.325 *B3*				6.375 *B3*	7.875 *B3*			5.375 *W6*				
	Claymont, Del.														
	Coatesville, Pa.														
	Conshohocken, Pa.	4.375 *A2*	5.375 *A2*				6.425 *A2*								
	Harrisburg, Pa.														
	Hartford, Conn.														
	Johnstown, Pa.										5.375 *B3*				
	Fairless, Pa.	4.375 *UI*	5.375 *UI*				6.425 *UI*	7.925 *UI*					$9.30 *UI*	$8.00 *UI*	
	New Haven, Conn.														
	Phoenixville, Pa.														
	Sparrows Pt., Md.	4.325 *B3*	5.325 *B3*	5.85 *B3*			6.375 *B3*	7.875 *B3*	8.60 *B3*		5.475 *B3*		$9.30 *B3*	$8.00 *B3*	
	Worcester, Mass.										5.675 *A5*				
	Trenton, N. J.														
MIDDLE WEST	Alton, Ill.										5.20 *LI*				
	Ashland, Ky.	4.325 *A7*		5.85 *A7*	5.90 *A7*										
	Canton-Massillon, Dover, Ohio			5.85 *RI, R3*											
	Chicago, Joliet, Ill.	4.55 *AI* 4.325 *W8*					6.375 *UI*				5.025 *N4* 5.375 *A5, R3*				
	Sterling, Ill.										5.375 *N4*				
	Cleveland, Ohio	4.325 *J3, R3*	5.325 *J3, R3*		5.90 *R3*		6.375 *J3, R3*	7.875 *J3, R3*			5.375 *A5*				
	Detroit, Mich.	4.425 *G3, M2*	5.425 *G3* 5.325 *M2*				6.475 *G3*	7.975 *G3*							
	Newport, Ky.	4.325 *N5*	5.325 *N5*	5.85 *N5*											
	Gary, Ind. Harbor, Indiana	4.325 *I3, UI, YI*	5.325 *I3, UI, YI*	5.85 *UI, I3*	5.90 *UI, I3*	6.25 *UI*	6.375 *YI, UI, I3*	7.875 *UI, YI*			5.025 *YI*		$9.20 *I3, UI, YI*	$7.90 *I3, UI, YI*	6.65 *UI, YI*
	Granite City, Ill.	4.525 *G2*	5.525 *G2*	6.05 *G2*	6.10 *G2*									$8.00 *G2*	6.75 *G2*
	Kokomo, Ind.			5.95 *C9*							5.475 *C9*				
	Mansfield, Ohio	4.325 *E2*	5.325 *E2*			6.25 *E2*				*E2*					
	Middletown, Ohio		5.325 *A7*	5.85 *A7*	5.90 *A7*	6.25 *A7*									
	Niles, Warren, Ohio Sharon, Pa.	4.325 *SI, R3, N3*	5.325 *R3, N3*	5.85 *R3* 6.85 *N3*	5.90 *N3*	6.25 *N3*	6.375 *SI, R3*	7.875 *R3*					$9.20 *R3*	$7.90 *R3*	
	Pittsburgh, Pa. Midland, Pa. Butler, Pa.	4.325 *J3, UI, P6*	5.325 *J3, UI, P6*	5.85 *UI*	5.90 *UI, A7*		6.375 *J3, UI*	7.875 *UI*	8.60 *UI*		5.025 *P6* 5.375 *A5*		$9.20 *J3, UI*	$7.90 *J3, UI*	6.65 *UI*
	Portsmouth, Ohio	4.325 *P7*	5.325 *P7*								5.375 *P7*				
	Weirton, Wheeling, Follansbee, W. Va.	4.325 *W3, W5*	5.325 *W3, W5, F3*	5.85 *W3, W5*		6.25 *W3, W5*	6.375 *W3*	7.875 *W3*					$9.20 *W3, W5*	$7.90 *W3, W5*	6.65 *F3, W5*
	Youngstown, Ohio	4.325 *UI, YI*	5.325 *YI*		5.90 *YI*		6.375 *UI, YI*	7.875 *YI*			5.025 *YI*				
WEST	Fontana, Cal.	5.075 *KI*	6.425 *KI*				7.125 *KI*	8.975 *KI*							
	Geneva, Utah	4.425 *C7*													
	Kansas City, Mo.										5.625 *S2*				
	Los Angeles, Torrance, Cal.										6.175 *B2*				
	Minnequa, Colo.										5.275 *C6*				
	San Francisco, Niles, Pittsburg, Cal.	5.025 *C7*	6.275 *C7*	6.00 *C7*							5.675 *C7*		$9.95 *C7*	$8.65 *C7*	
	Seattle, Wash.														
SOUTH	Atlanta, Ga.														
	Fairfield, Ala. Alabama City, Ala.	4.325 *R3, T2*	5.325 *T2*	5.85 *R3, T2*			6.375 *T2*			5.625 *R3*	5.025 *R3, T2*		$9.30 *T2*	$8.00 *T2*	
	Houston, Tex.										5.625 *S2*				

STEEL PRICES

(Effective Feb. 14, 1956)

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BARS						PLATES				WIRE
		Carbon Steel	Reinforcing	Cold Finished	Alloy Hot-rolled	Alloy Cold Drawn	Hi Str. H.R. Low Alloy	Carbon Steel	Floor Plate	Alloy	Hi Str. Low Alloy	Mfr's. Bright
EAST	Bethlehem, Pa.				5.575 *B3*	7.425 *B3*	6.80 *B3*					
	Buffalo, N. Y.	4.65 *B3,R3*	4.65 *B3,R3*	6.30 *B5*	5.575 *B3,R3*	7.425 *B3,B5*	6.80 *B3*	4.50 *B3,R3*				6.60 *W6*
	Claymont, Del.							4.80 *C4*		6.30 *C4*	6.725 *C4*	
	Coatesville, Pa.							4.80 *L4*		6.30 *L4*	6.725 *L4*	
	Conshohocken, Pa.							4.50 *A2*	5.575 *A2*		6.725 *A2*	
	Harrisburg, Pa.							5.10 *P2*	5.575 *C3*			
	Hartford, Conn.			6.40 *R3*		7.725 *R3*						
	Johnstown, Pa.	4.65 *B3*	4.65 *B3*		5.575 *B3*		6.80 *B3*	4.50 *B3*		6.30 *B3*	6.725 *B3*	6.60 *B3*
	Fairless, Pa.	4.80 *U1*	4.80 *U1*		5.725 *U1*							
	Newark, N. J.			6.70 *W10*		7.60 *W10*						
	Camden, N. J.			6.35 *P10*								
	Bridgeport, Putnam, Conn.	4.80 *N8*		6.80 *W10*	5.725 *N8*			4.750 *N8*				
	Sparrows Pt., Md.		4.65 *B3*					4.50 *B3*		6.30 *B3*	6.725 *B3*	6.70 *B3*
	Palmer, Worcester, Readville, Mass. Milton, Pa.	4.80 *M7*	4.80 *M7*	6.70 *W11* 6.45 *C14* 6.70 *B5*		7.725 *A5,B5*		4.50 *R3*				6.90 *A5* 6.90 *W6*
	Spring City, Pa.			6.35 *K4*		7.60 *K4*						
MIDDLE WEST	Alton, Ill.	4.85 *L1*										6.425 *L1*
	Ashland, Newport, Ky.							4.50 *A7,N5*		6.30 *N5*		
	Canton-Massillon, Mansfield, Ohio	4.75 *R3*		5.90 *R2,R3*	5.575 *R3,T5*	7.425 *R2,R3, T5*		4.50 *E2*				
	Chicago, Joliet, Ill.	4.65 *U1, N4,W8,R3, P13*	4.65 *N4,R3, P13*	5.90 *L2* 6.25 *B5, W8, W10, A5*	5.575 *U1,R3, W8*	7.425 *A5,W8, W10,L2,B5*		4.50 *U1,W8, I3,R3* 4.275 *A1*	5.575 *U1*	6.30 *U1*	6.725 *U1*	6.60 *A5,R3, N4,W7*
	Cleveland, Ohio	4.65 *R3*	4.65 *R3*	5.90 *C13* 6.25 *A5*		7.425 *A5,C13*	6.80 *R3*	4.80 *J3,R3*	5.575 *J3*		6.725 *R3,J3*	6.60 *A5, C13*
	Detroit, Mich.	4.75 *G3*	4.75 *G3*	5.90 *R5* 6.45 *B5* 6.15 *P3* 6.10 *P8*	5.575 *R5* 5.675 *G3*	7.425 *R5* 7.625 *B5,P3 P8*	6.90 *G3*	4.80 *G3*			6.825 *G3*	
	Duluth, Minn.											6.60 *A5*
	Gary, Ind. Harbor, Crawfordsville	4.65 *I3, U1, Y1*	4.65 *I3, U1, Y1*	5.90 *M5,R3*	5.575 *I3, U1, Y1*	7.425 *M5, R3*	6.80 *U1, I3, Y1*	4.50 *I3, U1,Y1*	5.575 *I3*	6.30 *U1, Y1*	6.725 *U1, I3,Y1*	6.35 *M4*
	Granite City, Ill.							4.70 *G2*				
	Kokomo, Ind.											6.70 *C9*
	Sterling, Ill.	4.75 *N4*	4.75 *N4*									6.60 *N4*
	Niles, Warren, Ohio Sharon, Pa.	4.65 *R3,C10*		5.90 *C10*	5.575 *C10*	7.425 *C10*	6.80 *R3*	4.50 *S1,R3*		6.30 *S1*	6.725 *S1*	
	Pittsburgh, Pa. Midland, Pa.	4.65 *J3, U1, C11*	4.65 *J3, U1*	6.25 *A5,C8, C11,J3, W10,B4,R3*	5.575 *U1,C11*	7.425 *A5,C11, W10,C8,R3*	6.80 *J3, U1*	4.50 *J3, U1*	5.575 *U1*	6.30 *U1*	6.725 *J3, U1*	6.60 *A5,J3, P6*
	Portsmouth, Ohio											6.60 *P7*
	Weirton, Wheeling, Follansbee, W. Va.	4.65 *W3*						4.50 *W3,W5*				
	Youngstown, Ohio	4.65 *U1, Y1, C10,R3*	4.65 *U1, Y1, R3*	5.90 *Y1, U1*	5.575 *U1, Y1, C10*	7.425 *Y1,C10 F2*	6.80 *U1, Y1*	4.50 *U1, Y1, R3*		6.30 *Y1*	6.725 *Y1*	6.25 *Y1*
WEST	Emeryville, Cal.	5.40 *J5*	5.40 *J5*									
	Fontana, Cal.	5.35 *K1*	5.35 *K1*		6.625 *K1*		7.50 *K1*	5.15 *K1*		6.95 *K1*	7.375 *K1*	
	Geneva, Utah							4.50 *C7*			6.725 *C7*	
	Kansas City, Mo.	4.90 *S2*	4.90 *S2*		5.825 *S2*		7.05 *S2*					6.85 *S2*
	Los Angeles, Torrance, Cal.	5.35 *B2,C7*	5.35 *B2,C7*	7.35 *R3*	6.625 *B2*		7.50 *B2*				7.825 *B2*	7.55 *B2*
	Minnequa, Colo.	5.10 *C6*	5.10 *C6*					5.35 *C6*				6.50 *C6*
	Portland, Ore.	5.40 *O2*	5.40 *O2*									
	San Francisco, Niles, Pittsburg, Cal.	5.35 *C7* 5.40 *B2,P9*	5.35 *C7* 5.40 *B2,P9*				7.55 *B2*					7.20 *C7*
	Seattle, Wash.	5.40 *B2,P12, N6*	5.40 *B2,P12*				7.55 *B2*	5.40 *B2*		7.20 *B2*	7.825 *B2*	
SOUTH	Atlanta, Ga.	4.85 *A8*	4.85 *A8*									6.45 *A8*
	Fairfield, Ala. City, Birmingham, Ala.	4.65 *T2,R3* 5.15 *C16*	4.65 *T2,R3* 5.15 *C16*				6.80 *T2*	4.50 *T2,R3*			6.725 *T2*	6.60 *R3, T2*
	Houston, Ft. Worth, Lone Star, Tex.	4.90 *S2*	4.90 *S2*		5.825 *S2*		7.05 *S2*	4.85 *L3* 4.60 *S2*		6.40 *S2*	6.825 *S2*	6.85 *S2*

Steel Prices *(Effective Feb. 1½, 1956)*

Key to Steel Producers

With Principal Offices

A1 Acme Steel Co., Chicago
A2 Alan Wood Steel Co., Conshohocken, Pa.
A3 Allegheny Ludlum Steel Corp., Pittsburgh
A4 American Cladmetals Co., Carnegie, Pa.
A5 American Steel & Wire Div., Cleveland
A6 Angell Nail & Chaplet Co., Cleveland
A7 Armco Steel Corp., Middletown, O.
A8 Atlantic Steel Co., Atlanta, Ga.

B1 Babcock & Wilcox Tube Div., Beaver Falls, Pa.
B2 Bethlehem Pacific Coast Steel Corp., San Francisco
B3 Bethlehem Steel Co., Bethlehem, Pa.
B4 Blair Strip Steel Co., New Castle, Pa.
B5 Bliss & Laughlin, Inc., Harvey, Ill.
B6 Brook Plant, Wickwire Spencer Steel Div., Birdsboro, Pa.

C1 Calstrip Steel Corp., Los Angeles
C2 Carpenter Steel Co., Reading, Pa.
C3 Central Iron & Steel Co., Harrisburg, Pa.
C4 Claymont Products Dept., Claymont, Del.
C5 Cold Metal Products Co., Youngstown, O.
C6 Colorado Fuel & Iron Corp., Denver
C7 Columbia Geneva Steel Div., San Francisco
C8 Columbia Steel & Shafting Co., Pittsburgh
C9 Continental Steel Corp., Kokomo, Ind.
C10 Copperweld Steel Co., Pittsburgh, Pa.
C11 Crucible Steel Co. of America, Pittsburgh
C12 Cumberland Steel Co., Cumberland, Md.
C13 Cuyahoga Steel & Wire Co., Cleveland
C14 Compressed Steel Shafting Co., Readville, Mass.
C15 G. O. Carlson, Inc., Thorndale, Pa.
C16 Connors Steel Div., Birmingham
C17 Chester Blast Furnace Inc., Chester, Pa.

D1 Detroit Steel Corp., Detroit
D2 Detroit Tube & Steel Div., Detroit
D3 Driver Harris Co., Harrison, N. J.
D4 Dickson Weatherproof Nail Co., Evanston, Ill.
D5 Henry Disston & Sons, Inc., Philadelphia

E1 Eastern Stainless Steel Corp., Baltimore
E2 Empire Steel Co., Mansfield, O.

F1 Firth Sterling, Inc., McKeesport, Pa.
F2 Fitzsimmons Steel Corp., Youngstown
F3 Follansbee Steel Corp., Follansbee, W. Va.

G1 Globe Iron Co., Jackson, O.
G2 Granite City Stee Co., Granite City, Ill.
G3 Great Lakes Steel Corp., Detroit
G4 Greer Steel Co., Dover, O.

H1 Hanna Furnace Corp., Detroit

I1 Ingersoll Steel Div., Chicago
I3 Inland Steel Co., Chicago
I4 Interlake Iron Corp., Cleveland

J1 Jackson Iron & Steel Co., Jackson, O.
J2 Jessop Steel Corp., Washington, Pa.
J3 Jones & Laughlin Steel Corp., Pittsburgh
J4 Joslyn Mfg. & Supply Co., Chicago
J5 Judson Steel Corp., Emeryville, Calif.

K1 Kaiser Steel Corp., Fontana, Cal.
K2 Keystone Steel & Wire Co., Peoria
K3 Koppers Co., Granite City, Ill.
K4 Keystone Drawn Steel Co., Spring City, Pa.

L1 Laclede Steel Co., St. Louis
L2 La Salle Steel Co., Chicago
L3 Lone Star Steel Co., Dallas
L4 Lukens Steel Co., Coatesville, Pa.

M1 Mahoning Valley Steel Co., Niles, O.
M2 McLouth Steel Corp., Detroit
M3 Mercer Tube & Mfg. Co., Sharon, Pa.
M4 Mid-States Steel & Wire Co., Crawfordsville, Ind.
M5 Monarch Steel Div., Hammond, Ind.
M6 Mystic Iron Works, Everett, Mass.
M7 Milton Steel Products Div., Milton, Pa.

N1 National Supply Co., Pittsburgh
N2 National Tube Div., Pittsburgh
N3 Niles Rolling Mill Div., Niles, O.
N4 Northwestern Steel & Wire Co., Sterling, Ill.
N5 Newport Steel Corp., Newport, Ky.
N6 Northwest Steel Rolling Mills, Seattle
N7 Newman Crosby Steel Co., Pawtucket, R. I.
N8 Northeastern Steel Corp., Bridgeport, Conn.

O1 Oliver Iron & Steel Co., Pittsburgh
O2 Oregon Steel Mills, Portland

P1 Page Steel & Wire Div., Monessen, Pa.
P2 Phoenix Iron & Steel Co., Phoenixville, Pa.
P3 Pilgrim Drawn Steel Div., Plymouth, Mich.
P4 Pittsburgh Coke & Chemical Co., Pittsburgh
P5 Pittsburgh Screw & Bolt Co., Pittsburgh
P6 Pittsburgh Steel Co., Pittsburgh
P7 Portsmouth Div., Detroit Steel Corp., Detroit
P8 Plymouth Steel Co., Detroit
P9 Pacific States Steel Co., Niles, Cal.
P10 Precision Drawn Steel Co., Camden, N. J.
P11 Production Steel Strip Corp., Detroit
P12 Pacific Steel Rolling Mills, Seattle
P13 Phoenix Mfg. Co., Joliet, Ill.

R1 Reeves Steel & Mfg. Co., Dover, O.
R2 Reliance Div., Eaton Mfg. Co., Massillon, O.
R3 Republic Steel Corp., Cleveland
R4 Roebling Sons Co., John A., Trenton, N. J.
R5 Rotary Electric Steel Co., Detroit
R6 Rodney Metals, Inc., New Bedford, Mass.
R7 Rome Strip Steel Co., Rome, N. Y.

S1 Sharon Steel Corp., Sharon, Pa.
S2 Sheffield Steel Corp., Kansas City
S3 Shenango Furnace Co., Pittsburgh
S4 Simonds Saw & Steel Co., Fitchburg, Mass.
S5 Sweet's Steel Co., Williamsport, Pa.
S6 Standard Forging Corp., Chicago
S7 Stanley Works, New Britain, Conn.
S8 Superior Drawn Steel Co., Monaca, Pa.
S9 Superior Steel Corp., Carnegie, Pa.
S10 Seneca Steel Service, Buffalo

T1 Tonawanda Iron Div., N. Tonawanda, N. Y.
T2 Tennessee Coal & Iron Div., Fairfield
T3 Tennessee Products & Chem. Corp., Nashville
T4 Thomas Strip Div., Warren, O.
T5 Timken Steel & Tube Div., Canton, O.
T6 Tremont Nail Co., Wareham, Mass.
T7 Texas Steel Co., Fort Worth
T8 Thompson Wire Co., Boston

U1 United States Steel Corp., Pittsburgh
U2 Universal-Cyclops Steel Corp., Bridgeville, Pa.
U3 Ulbrich Stainless Steels, Wallingford, Conn.
U4 U. S. Pipe & Foundry Co., Birmingham

W1 Wallingford Steel Co., Wallingford, Conn.
W2 Washington Steel Corp., Washington, Pa.
W3 Weirton Steel Co., Weirton, W. Va.
W4 Wheatland Tube Co., Wheatland, Pa.
W5 Wheeling Steel Corp., Wheeling, W. Va.
W6 Wickwire Spencer Steel Div., Buffalo
W7 Wilson Steel & Wire Co., Chicago
W8 Wisconsin Steel Co., S. Chicago, Ill.
W9 Woodward Iron Co., Woodward, Ala.
W10 Wyckoff Steel Co., Pittsburgh
W11 Worcester Pressed Steel Co., Worcester, Mass.
W12 Wallace Barnes Steel Div., Bristol, Conn.

Y1 Youngstown Sheet & Tube Co., Youngstown, O.

PIPE AND TUBING

Base discounts (pct) f.o.b. mills. Base price about $200 per net ton.

	BUTTWELD														SEAMLESS							
	½ In.		¾ In.		1 In.		1¼ In.		1½ In.		2 In.		2½–3 In.		2 In.		2½ In.		3 In.		3½–4 In.	
STANDARD T. & C.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.
Sparrows Pt. *B3*	16.50	1.25	19.50	5.25	22.00	8.75	24.50	9.50	25.00	10.50	25.50	11.00	27.00	10.75								
Youngstown *R3*	18.50	1.25	21.50	5.25	24.00	8.75	26.50	10.00	27.00	11.00	27.50	11.50	29.00	11.75								
Fontana *K1*	7.00	+2.25	10.00	+0.25	12.50	+4.75	15.00	+3.00	15.50	+2.00	16.00	+1.50	17.50	+0.75								
Pittsburgh *J3*	18.50	1.25	21.50	7.25	24.00	10.75	26.50	11.50	27.00	12.50	27.50	13.00	29.00	12.75	6.50	+8.50	10.50	+6.25	13.00	+3.75	14.50	+2.25
Alton, Ill. *L1*	16.50	1.25	19.50	5.25	22.00	8.75	24.50	9.50	25.00	10.50	25.50	11.00	27.00	10.75								
Sharon *M3*	18.50	3.25	21.50	7.25	24.00	10.75	26.50	11.50	27.00	12.50	27.50	13.00	29.00	12.75								
Fairless *N2*	16.50	1.25	19.50	5.25	22.00	8.75	24.50	9.50	25.00	10.50	25.50	11.00	27.00	10.75								
Pittsburgh *N1*	18.50	3.25	21.50	7.25	24.00	10.75	26.50	11.50	27.00	12.50	27.50	13.00	29.00	12.75	6.50	+8.50	10.50	+6.25	13.00	+3.75	14.50	+2.25
Wheeling *W5*	18.50	3.25	21.50	7.25	24.00	10.75	26.50	11.50	27.00	12.50	27.50	13.00	29.00	12.75								
Wheatland *W4*	18.50	3.25	21.50	7.25	24.00	10.75	26.50	11.50	27.00	12.50	27.50	13.00	29.00	12.75								
Youngstown *Y1*	18.50	3.25	21.50	7.25	24.00	10.75	26.50	11.50	27.00	12.50	27.50	13.00	29.00	12.75	6.50	+8.50	10.50	+6.25	13.00	+3.75	14.50	+2.25
Indiana Harbor *Y1*	17.50	2.25	20.50	6.25	23.00	9.75	25.50	10.00	26.00	11.50	26.50	12.00	28.00	11.75								
Lorain *N2*	18.50	3.25	21.50	7.25	24.00	10.75	26.50	11.50	27.00	12.50	27.50	13.00	29.00	12.75	6.50	+8.50	10.50	+6.25	13.00	+3.75	14.50	+2.25
EXTRA STRONG PLAIN ENDS																						
Sparrows Pt. *B3*	21.00	7.25	25.00	11.25	27.00	14.75	27.50	13.50	28.00	14.50	28.50	15.00	29.00	13.75								
Youngstown *R3*	23.00	7.25	27.00	11.25	29.00	14.75	29.50	14.00	30.00	15.00	30.50	15.50	31.00	14.75								
Fairless *N2*	21.00	7.25	25.00	11.25	27.00	14.75	27.50	13.50	28.00	14.50	28.50	15.00	29.00	13.75								
Fontana *K1*	11.50		15.50		17.50		18.00		18.50		19.00		19.50									
Pittsburgh *J3*	23.00	9.25	27.00	13.25	29.00	16.75	29.50	15.50	30.00	16.50	30.50	17.00	31.00	15.75	8.00	+6.00	13.00	+2.75	15.50	+0.25	20.50	4.75
Alton, Ill. *L1*	21.00	7.25	25.00	11.25	27.00	14.75	27.50	13.50	28.00	14.50	28.50	15.00	29.00	13.75								
Sharon *M3*	23.00	9.25	27.00	13.25	29.00	16.75	29.50	15.50	30.00	16.50	30.50	17.00	31.00	15.75								
Pittsburgh *N1*	23.00	9.25	27.00	13.25	29.00	16.75	29.50	15.50	30.00	16.50	30.50	17.00	31.00	15.75	8.00	+6.00	13.00	+2.75	15.50	+0.25	20.50	4.75
Wheeling *W5*	23.00	9.25	27.00	13.25	29.00	16.75	29.50	15.50	30.00	16.50	30.50	17.00	31.00	15.75								
Wheatland *W4*	23.00	9.25	27.00	13.25	29.00	16.75	29.50	15.50	30.00	16.50	30.50	17.00	31.00	15.75								
Youngstown *Y1*	23.00	9.25	27.00	13.25	29.00	16.75	29.50	15.50	30.00	16.50	30.50	17.00	31.00	15.75	8.00	+6.00	13.00	+2.75	15.50	+0.25	20.50	4.75
Indiana Harbor *Y1*	22.00	8.25	26.00	12.25	28.00	15.75	28.50	14.50	29.00	15.50	29.50	16.00	30.00	14.75								
Lorain *N2*	21.00	9.25	27.00	13.25	29.00	16.75	29.50	15.50	30.00	16.50	30.50	17.00	31.00	15.75	8.00	+6.00	13.00	+2.75	15.50	+0.25	20.50	4.75

Threads only, buttweld and seamless 2½ pt higher discount. Plain ends, buttweld and seamless, 3-in. and under, 5½ pt higher discount.

Galvanized discounts based on zinc price range of over 9¢ to 11¢ per lb, East St. Louis. For each 2¢ change in zinc, discounts vary as follows: ½, ¾ and 1-in., 2 pt.; 1¼, 1½ and 2 in., 1½ pt.; 2½ and 3-in., 1 pt. e.g., zinc price range of over 11¢ to 13¢ would lower discounts; zinc price in range over 7¢ to 9¢ would increase discounts. East St. Louis zinc price now 13.50¢ per lb.

TOOL STEEL

F.o.b. mill

W	Cr	V	Mo	Co	per lb
18	4	1	—	—	$1.60
18	4	1	—	5	2.305
18	4	2	—	—	1.765
1.5	4	1.5	8	—	.96
6	4	3	6	—	1.35
6	4	2	5	—	1.105

High-carbon chromium ..... .77
Oil hardened manganese ..... .43
Special carbon ..... .39
Extra carbon ..... .33
Regular carbon ..... .275

Warehouse prices on and east of Mississippi are 4¢ per lb higher. West of Mississippi, 6¢ higher.

CLAD STEEL

Base prices, cents per lb f.o.b.

	Cladding	Plate (*A3, J2, L6*) 10 pct	15 pct	20 pct	Sheet (*I7*) 20 pct
Stainless Type	304	30.30	33.15	36.05	32.50
	316	35.50	38.45	41.40	47.00
	321	32.00	34.85	37.75	37.25
	347	34.40	37.90	41.40	48.25
	405	25.80	29.60	33.35	.....
	410, 430	25.30	29.10	32.85	.....

CR Strip (*S9*) Copper, 10 pct, 2 sides, 28.00; 1 side, 20.00.

ELECTRICAL SHEETS

22-Gage F.o.b. Mill Cents Per Lb	Hot-Rolled (Cut Lengths)*	Cold-Reduced (Coiled or Cut Length) Semi-Processed	Fully Processed
Field	8.40	8.60	.....
Armature	9.35	9.60	10.10
Elect.	9.95	10.20	10.70
Meter	10.95	11.20	11.70
Dynamo	11.85	12.10	12.60
Trans. 72	12.80	13.05	13.55
		Grain Oriented	
Trans. 65	13.35	Trans. 80	17.45
Trans. 58	13.85	Trans. 73	17.95
Trans. 52	14.85		

Producing points: Beech Bottom (*W5*); Brackenridge (*A3*); Granite City (*G2*); Indiana Harbor (*I3*); Mansfield (*E2*); Newport, Ky. (*N5*); Niles, O. (*N3*); Vandergrift (*U1*); Warren, O. (*R3*); Zanesville (*A7*).

* Coils 75¢ higher.

LAKE SUPERIOR ORES

51.50% Fe natural content, delivered lower Lake ports. Prices for 1956 season. Freight changes for seller's account.

	Gross Ton
Openhearth lump	$12.10
Old range, bessemer	11.25
Old range, nonbessemer	11.10
Mesabi, bessemer	11.00
Mesabi, nonbessemer	10.85
High phosphorus	10.85

MERCHANT WIRE PRODUCTS

F.o.b. Mill	Standard & Coated Nails Cal	Woven Wire Fence 9–15½ ga. Cal	"T" Fence Posts Cal	Single Loop Bale Ties Cal	Galv. Barbed and Twisted Barbless Wire Cal	Merch. Wire Ann'ld ¢/lb.	Merch. Wire Galv. ¢/lb.
Alabama City *R3*	152	162	...	173	175	7.40	7.80
Aliquippa, Pa. *J3*	152	162	...	...	...	7.40	7.80
Atlanta *A8*	154	167	...	175	180	7.50	8.025
Bartonville *K2**	154	168	...	175	181	7.50	8.075
Buffalo *W6*	...	...	...	...	...	7.40	7.80
Chicago, Ill. *N4***	152	166	...	173	179	7.40	8.00
Cleveland *A6*	157	...	...	...	...	7.40	.....
Cleveland *A3*	...	...	...	...	...	7.40	.....
Crawfordsville *M4**	154	167	...	175	175	7.50	8.05
Donora, Pa. *A5*	152	162	...	173	175	7.40	7.80
Duluth *A5*	152	162	...	173	175	7.40	7.80
Fairfield, Ala. *T2*	152	162	...	173	175	7.40	7.80
Galveston *D4*	157	...	...	...	...	...	.....
Houston *S2*	157	170	...	...	180	7.65	8.05
Johnstown, Pa. *B3**	152	166	...	...	175	7.40	7.80
Joliet, Ill. *A5*	152	162	...	173	175	7.40	7.80
Kokomo, Ind. *C9*	154	154	...	175	177	7.50	7.90
Los Angeles *B2**	...	...	...	...	...	8.35	8.925
Kansas City *S2*	157	167	...	178	180	7.65	8.05
Minnequa *C6*	157	167	162	178	180	7.65	8.05
Monessen *P6*	152	162	...	...	...	7.40	7.80
Moline, Ill. *R3*	...	162	162	...	...	...	.....
Pittsburg, Cal. *C7*	171	185	...	...	195	8.35	8.75
Portsmouth *P7*	...	...	...	...	...	7.40	.....
Rankin, Pa. *A5*	152	162	...	...	175	7.40	7.80
So. Chicago *R3*	152	162	157	173	175	7.40	7.80
S. San Francisco *C6*	...	...	...	197	195	8.35	8.75
Sparrows Pt. *B3**	154	...	...	175	181	7.50	8.075
Struthers, O. *Y1*	...	...	...	...	...	7.40	7.90
Worcester *A5*	158	...	...	...	...	7.70	.....
Williamsport, Pa. *S5*	...	...	160	...	...	...	.....

Galvanized products computed with zinc at 5¢ per lb. Exceptions: *zinc at 12.5¢ per lb; **13¢ zinc.

C-R SPRING STEEL

Cents Per Lb F.o.b. Mill	CARBON CONTENT 0.26–0.40	0.41–0.60	0.61–0.80	0.81–1.05	1.06–1.35
Bristol, Conn. *W12*	...	...	10.80	12.95	15.65
Buffalo, N. Y. *R7*	7.00	8.95	10.50	12.65	15.35
Carnegie, Pa. *S9*	...	9.05	10.60	12.75	15.35
Cleveland *A5*	7.10	9.05	10.60	12.75	15.45
Detroit *D1*	7.20	9.15	10.70	12.85	.....
Detroit *D2*	7.20	9.15	10.70	...	.....
Harrison, N. J. *C11*	...	...	10.90	13.05	15.75
Indianapolis *C5*	7.15	9.10	10.50	12.65	15.35
New Castle, Pa. *B4*	7.00	8.95	10.50	12.65	.....
New Haven, Conn. *D1*	7.55	9.35	10.90	13.05	.....
Pawtucket, R.I. *N7*	7.65	9.35	10.90	13.05	15.75
Pittsburgh *S7*	7.10	9.05	10.60	12.75	15.45
Riverdale, Ill. *A1*	7.20	9.05	10.60	12.75	15.45
Sharon, Pa. *S1*	7.10	9.05	10.60	12.75	15.45
Trenton *R4*	...	...	...	...	.....
Wallingford *W1*	7.45	9.25	10.80	12.95	15.65
Warren, Ohio *T4*	7.00	8.95	10.50	12.65	15.35
Weirton, W. Va. *W3*	7.10	8.95	10.50	...	.....
Worcester, Mass. *A5*	7.65	9.35	10.90	13.05	15.75
Youngstown *C5*	7.00	8.95	10.50	12.65	15.35

BOILER TUBES

$ per 100 ft. carload lots, cut 10 to 24 ft. F.o.b. Mill	Size OD-In.	Size B.W. Ga.	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.	Elec. Weld C.D.
Babcock & Wilcox	2	13	30.87	36.51	29.93	.....
	2½	12	41.57	49.16	40.31	.....
	3	12	47.99	56.76	46.55	.....
	3½	11	56.03	66.27	54.34	.....
	4	10	74.41	88.00	72.17	.....
National Tube	2	13	30.87	36.51	29.93	.....
	2½	12	42.57	49.16	40.31	.....
	3	12	47.99	56.76	46.55	.....
	3½	11	56.03	66.27	54.34	.....
	4	10	74.41	88.00	72.17	.....
Pittsburgh Steel	2	13	30.87	36.51	.....	.....
	2½	12	41.57	49.16	.....	.....
	3	12	47.99	56.76	.....	.....
	3½	11	56.03	66.27	.....	.....
	4	10	74.41	88.00	.....	.....

WAREHOUSES

Metropolitan Price, dollars per 100 lb.

Cities	‡ City Delivery Charge	Sheets Hot-Rolled	Sheets Cold-Rolled	Sheets Galvanized (10 gage)	Strip Hot-Rolled	Strip Cold-Rolled	Plates	Shapes Standard Structural	Bars Hot-Rolled	Bars Cold-Finished	Alloy Bars Hot-Rolled 4615 As rolled	Alloy Bars Hot-Rolled 4140 Annealed	Alloy Bars Cold-Drawn 4615 As rolled	Alloy Bars Cold-Drawn 4140 Annealed
Baltimore	$.10	7.03	8.32	8.37	7.65	.....	7.21	7.93	7.61	8.62	14.38	13.44–13.96	16.36	16.29–16.49
Birmingham	.15	6.80	7.93	8.85	7.06	.....	6.99	7.28	7.08	9.35	.....	.....	.....	.....
Boston	.10	7.85	8.91	10.37	8.06	.....	7.99	8.23	7.97	9.77	.....	13.60	.....	16.70
Buffalo	.15	7.35	8.40	10.16	7.50	.....	7.80	7.75	7.50	8.25	.....	13.45	.....	16.50
Chicago	.15	7.28	8.29	9.25	7.36	.....	7.60	7.58	7.42	7.90	.....	13.20	.....	16.30
Cincinnati	.15	7.24	8.23	9.10	7.45	.....	7.74	7.90	7.51	8.15	13.59	13.29	16.44	16.39
Cleveland	.15	7.28	8.24	8.95	7.31	.....	7.77	7.76	7.33	8.00	13.41	13.11	16.26	16.21
Denver	.....	8.60	10.76	11.22	8.90	.....	8.60	8.75	8.90	9.82	.....	.....	.....	17.97
Detroit	.15	7.47	8.43	8.93	7.49	.....	7.88	7.90	7.55	.....	13.70	13.40	16.55	16.50
Houston	.....	7.85	8.75	10.49	8.15	.....	7.80	8.20	8.25	9.85–9.95	14.35	14.00	17.15	17.05
Kansas City	.20	7.47	8.76	9.17	7.73	.....	7.66	7.95	7.75	8.52	13.87	13.52	16.72	16.57
Los Angeles	.10	8.15	10.10	11.10	8.45	.....	8.65	8.40	8.25	11.00	.....	14.45	.....	18.00
Memphis	.10	7.12	8.25	.....	7.38	.....	7.31	7.60	7.40	9.15	.....	.....	.....	.....
Milwaukee	.15	7.37	8.48	9.34	7.45	.....	7.69	7.75	7.51	8.09	.....	13.29	.....	16.39
New Orleans	.15	7.20	8.35	.....	7.45	.....	7.40	7.70	7.50	9.55	.....	.....	.....	.....
New York	.10	7.71	8.94	9.69	8.27	.....	7.96	8.19	8.21	9.68	.....	13.53	.....	16.63
Norfolk	.20	7.25	.....	.....	7.65	.....	7.45	7.95	7.65	9.50	.....	.....	.....	.....
Philadelphia	.10	7.29	8.52	9.47	7.77	.....	7.47	7.84	7.78	8.56	.....	13.31	.....	16.41
Pittsburgh	.15	7.28	8.24	9.40	7.31	9.00	7.60	7.43	7.27	8.00	13.35	13.05	16.20	16.15
Portland	.....	7.80–8.60	8.80–10.15	10.65	8.00	7.95	7.75	7.85–8.15	7.95	12.20	.....	15.00	.....	17.50
Salt Lake City	.20	.....	10.60	.....	9.35	.....	.....	9.20	9.15	.....	.....	.....	.....	.....
San Francisco	.10	8.20	9.75	10.25	8.45	.....	8.15	8.35	8.25	11.55	.....	14.45	.....	18.00
Seattle	.00	8.55	10.40	10.80	8.65	.....	8.20	8.30	8.40	.....	.....	14.65	.....	.....
St. Louis	.15	7.57	8.68	9.54	7.65	.....	7.89	7.98	7.71	8.44	.....	13.49	.....	16.59
St. Paul	.25	7.46	8.59–9.14	9.16	7.72	.....	7.65	7.94	7.74	8.51	.....	13.51	.....	16.31

Base Quantities (Standard unless otherwise keyed): Cold finished bars: 2000 lb or over. Alloy bars: 1000 to 1999 lb. All others: 2000 to 9999 lb. All HR products may be combined for quantity. All galvanized sheets may be combined for quantity. CR sheets may not be combined with each other or with galvanized sheets for quantity.

Exceptions: (1) 1500 to 9999 lb. (2) 1000 lb or over. (3) $.25 delivery. (4) 1000 to 1999 lb, $.25 delivery.

* Plus analysis charge. ‡ Deduct for country delivery.

(Effective Feb. 14, 1956)

RAILS, TRACK SUPPLIES

F.o.b. Mill Cents Per Lb	No. 1 Std. Rails	Light Rails	Joint Bars	Track Spikes	Screw Spikes	Tie Plates	Track Bolts Untreated
Bessemer *U1*	4.725	5.65	5.825				
So. Chicago *R3*				7.90			
Ensley *T2*	4.725	5.65					
Fairfield *T2*		5.65		7.90		5.625	
Gary *U1*	4.725	5.65				5.625	
Ind. Harbor *I3*	4.725		5.825	7.90		5.625	
Ind. Harbor *Y1*				7.90			
Johnstown *B3*		5.65					
Joliet *U1*		5.65	5.825				
Kansas City *S2*				7.90			
Lackawanna *B3*	4.725	5.65	5.825			5.625	
Lebanon *B3*							12.15
Minnequa *C6*	4.725	6.15	5.825	7.90		5.625	12.15
Pittsburgh *O1*					11.90		12.15
Pittsburgh *P3*							12.15
Pittsburgh *J3*				7.90			
Seattle *B2*				8.40		5.775	12.65
Steelton *B3*	4.725		5.825			5.625	
Struthers *Y1*				7.90			
Torrance *C7*						5.775	
Williamsport *S5*		5.65					
Youngstown *R3*				7.90			

COKE

Furnace, beehive (f.o.b. oven) Net-Ton
Connellsville, Pa. ..... $14.00 to $14.50
Foundry, beehive (f.o.b. oven)
Connellsville, Pa. ..... $16.00 to $16.50
Foundry, oven coke
Buffalo, del'd $28.08
Chicago, f.o.b. 25.75
Detroit, f.o.b. 26.25
New England, del'd 28.55
Seaboard, N. J., f.o.b. 26.75
Philadelphia, f.o.b. 26.50
Swedeland, Pa., f.o.b. 26.50
Painesville, Ohio, f.o.b. 25.50
Erie, Pa., f.o.b. 25.00
Cleveland, del'd 27.43
Cincinnati, del'd 26.56
St. Paul, f.o.b. 23.75
St. Louis, f.o.b. 26.00
Birmingham, f.o.b. 25.65
Lone Star, Tex., f.o.b. 19.50

ELECTRODES

Cents per lb, f.o.b. plant, threaded, with nipples, unboxed.

GRAPHITE			CARBON*		
Diam. (In.)	Length (In.)	Price	Diam. (In.)	Length (In.)	Price
24	84	23.00	40	100,110	9.90
20	72	22.25	35	110	9.90
16 to 18	72	22.50	30	110	10.05
14	72	23.00	24	72 to 84	10.30
12	72	23.50	20	90	10.10
10	60	24.25	17	72	10.35
7	60	24.50	14	72	10.85
5	60	27.25	12	60	11.75
4	40	30.25	10	60	11.80
3	40	32.00	8	60	12.10
2½	30	33.75			
2	24	52.50			

* Prices shown cover carbon nipples.

ELECTROPLATING SUPPLIES

Anodes

(Cents per lb, frt allowed in quantity)

Copper
Cast elliptical, 18 in. or longer, 5000 lb lots 58.92
Electrodeposited 55.25
Brass, 80-20, ball anodes, 2000 lb or more 58.00
Zinc, ball anodes, 2000 lb lots 20.75
(for elliptical add 2¢ per lb)
Nickel, 99 pct plus, rolled carbon .. 90.50
(rolled depolarized add 3¢ per lb)
Cadmium $1.70
Tin, ball anodes and elliptical . $1.06 to $1.10

Chemicals

(Cents per lb, f.o.b. shipping point)

Copper cyanide, 100 lb drum 83.50
Copper sulphate, 5 or more 100 lb bags, per cwt 18.15
Nickel salts, single, 4-100 lb bags .. 33.25
Nickel chloride, freight allowed, 300 lbs 43.50
Sodium cyanide, domestic, fob N. Y. 1 to 4 200 lb drums 21.55
(Philadelphia add .50 per lb)
Zinc cyanide, 100 to 900 lb 55.55
Potassium cyanide, 100 lb drum N. Y. 48.00
Chromic acid, flake type, 1 to 20 100 lb drums 31.20

BOLTS, NUTS, RIVETS, SCREWS

(Base discount, f.o.b. mill)

Machine and Carriage Bolt

	Discounts Full case Quantity	20,000 lb. or more
½ in. & smaller x 6 in. & shorter	61	63
Larger than ½ in. diam. and all diam. longer than 6 in.	55	57
Rolled thread carriage bolts ½ in. & smaller x 6 in. and shorter	61	63
Lag, all diam. x 6 in. & shorter	61	63
Lag, all diam. longer than 6 in.	55	57
Plow bolts	61	63

Nuts, Hex., H.P., reg. & hvy.

¾" or smaller	64	66
⅞" to 1⅛" inclusive	63	65
1¼" to 1½" inclusive	65	67
1⅝" and larger	61	63

C.P. Hex regular & hvy.

¾" or smaller	64	66
⅞" and larger	61	63

Hot Galv. Nuts (all types)

1½" or smaller	44	47

Finished, Semi-finished, Hex. Nuts

¾" and smaller	66	66
⅞" and larger	63	63

Add 25% for less than case or keg quantity.

Rivets

Base per 100 lb
½ in. and larger $9.95
Pct Off List
7/16 in. and smaller 32

Cap Screws

	Discount *Bright Treated*	*H.C. Heat*
New std. hex head, packaged ¼" thru ½" diam. x 6" and shorter	34	20
9/16" and ⅝" x 6" and smaller and shorter ..	31	16
¾", ⅞", 1" x 6" and shorter	9	+11
New std. hex head, bulk* ¼" thru ½" diam. x 6" and shorter	49	41
9/16" and ⅝" diam. x 6" and shorter	43	39
¾", ⅞", 1" x 6" and shorter	31	20

*Minimum quantity per item:
15,000 pieces ¼", 5/16", ⅜" diam.
5,000 pieces 7/16", ½", 9/16", ⅝" diam.
2,000 pieces ¾", ⅞", 1" diam.

Machine Screws & Stove Bolts

		Discount Mach. Screws	Stove Bolts
Packaged, package list ...		27	38
Bulk, bulk list	*Quantity*		
¼-in. diam. & under	25,000-200,000	20	61
5/16-in. diam. & larger	15,000-100,000	20	61
All diam. over 3 in. long	5,000-100,000	—	61

Machine Screw & Stove Bolt Nuts

		Discount Hex	Square
Packaged, package list ...		24	27
Bulk, bulk list	*Quantity*		
⅜-in. diam. & smaller	25,000-200,000	18	20

CAST IRON WATER PIPE INDEX

Birmingham	109.3
New York	121.5
Chicago	122.9
San Francisco-L. A.	131.1

Dec. 1955 value, Class B or heavier 6 in. or larger, bell and spigot pipe. Explanation: p. 57, Sept. 1 issue. Source: U. S. Pipe and Foundry Co.

REFRACTORIES

Fire Clay Brick

Carloads per 1000

First quality, Ill., Ky., Md., Mo., Ohio, Pa., (except Salina, Pa., add $5.00) $122.00
No. 1 Ohio ....
Sec. quality, Pa., Md., Ky., Mo., Ill. 114.00
No. 2 Ohio 98.00
Ground fire clay, net ton, bulk (except Salina, Pa., add $1.50). 18.00

Silica Brick

Mt. Union, Pa., Ensley, Ala. $128.00
Childs, Hays, Pa. 138.00
Chicago District 138.00
Western Utah 144.00
California 151.00
Super Duty
Hays, Pa., Athens, Tex., Windham, Warren, O. 145.00
Curtner, Calif. 163.00
Silica cement, net ton, bulk, Eastern (except Hays, Pa.) 21.00
Silica cement, net ton, bulk, Hays, Pa. 24.00
Silica cement, net ton, bulk, Chicago District, Ensley, Ala. 22.00
Silica cement, net ton, bulk, Utah and Calif. 32.00

Chrome Brick

Per net ton

Standard chemically bonded, Balt. $91.00
Standards chemically bonded, Curtner, Calif. 101.25
Burned, Balt. 85.00

Magesite Brick

Standard Baltimore $114.00
Chemically bonded, Baltimore 102.00

Grain Magnesite

St. ¾-in. grains

Domestic, f.o.b. Baltimore in bulk fines removed $64.00
Domestic, f.o.b. Chewalah, Wash., Luning, Nev.
in bulk 40.00
in sacks 46.00

Dead Burned Dolomite

Per net ton

F.o.b. bulk, producing points in:
Pa., W. Va., Ohio $15.00
Midwest 15.60
Missouri Valley 14.00

METAL POWDERS

Per pound, f.o.b. shipping point, in ton lots, for minus 100 mesh.

Swedish sponge iron c.i.f. New York, ocean bags ... 9.50¢
Canadian sponge iron, Del'd in East, carloads .. 9.5¢
Domestic sponge iron, 98+% Fe, carload lots ..... 9.5¢
Electrolytic iron, annealed, imported 99.5+% Fe ..... 27.5¢
domestic 99.5+% Fe ..... 36.5¢
Electrolytic iron, unannealed minus 325 mesh, 99+% Fe 57.0¢
Electrolytic iron melting stock, 99.84% pure ..... 22.0¢
Carbonyl iron size 5 to 10 micron, 98%, 00.8+% Fe . 86.0¢ to $1.55
Aluminum freight allowed ... 34.50¢
Brass, 10 ton lots ..... 37.50¢ to 50.00¢
Copper, electrolytic ..... 61.50¢
Copper, reduced ..... 61.50¢
Cadmium, 100-199 lb. 95¢ plus metal value
Chromium, electrolytic 99.85% min. Fe .03 max. Del'd... $5.00
Lead .....7.50¢ plus metal value
Manganese ..... 70.0¢
Molybdenum, 99% .....$3.00 to $3.25
Nickel, unannealed $1.00
Nickel, annealed $1.06
Nickel, spherical, unannealed, #80 ..... $1.18
Silicon ..... 43.50¢
Solder powder 7.0¢ to 9.0¢ plus met. value
Stainless steel, 302 ..... 99.0¢
Stainless steel, 316 ..... $1.32
Tin .....14.00¢ plus metal value
Tungsten, 99% (65 mesh) .. $4.50
Zinc, 10 ton lots .....18.75¢ to 32.50¢

Ferroalloy Prices

(Effective Feb. 1¼, 1956)

This page will not appear in Feb. 23 issue. Back on March 1.

Ferrochrome

Contract prices, cents per lb contained Cr, lump, bulk carloads, del'd, 67-71% Cr, .30-1.00% max. Si.

0.02% C	38.50	0.20% C	35.50
0.03% C	38.00	0.50% C	35.25
0.06% C	36.50	1.00% C	34.00
0.10% C	36.00	1.50% C	33.85
0.15% C	35.75	2.00% C	33.75

4.00-4.50 C, 67.70% Cr, 1-2% Si ... 26.25
3.50-5.00% C, 57-64% Cr, 2.00-4.50% Si ... 25.00
0.025% C (Simplex) ... 31.75

High Nitrogen Ferrochrome

Low-carbon type 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome price schedule. Add 5¢ for each additional 0.25% of N.

Chromium Metal

Contract prices, per lb chromium contained, packed, delivered, ton lots, 97% min. Cr, 1% max. Fe.

0.10% max. C	$1.27
0.50% max. C	1.27
9 to 11% C, 88-91% Cr, 0.75% Fe	1.36

Electrolytic Chromium Metal

Contract prices per lb of metal 2" x D plate (⅜" thick) delivered packed. 99.80% min. Cr. (Metallic Base) Fe 0.20 max.

Carloads	1.25
Ton lots	1.27
Less ton lots	1.29

Low Carbon Ferrochrome Silicon

(Cr 34-41%, Si 42-45%, C 0.05% max.) Contract price, carloads, delivered, lump, 3-in. x down, per lb of Cr, packed.

Carloads	41.85
Ton lots	46.15
Less ton lots	48.65

Calcium-Silicon

Contract price per lb of alloy, lump, delivered, packed.
30-33% Cr, 60-65% Si, 3.00 max. Fe.

Carloads	22.95
Ton lots	25.25
Less ton lots	26.75

Calcium-Manganese—Silicon

Contract prices, cents per lb of alloy, lump, delivered, packed.
16-20% Ca, 14-18% Mn, 53-59% Si.

Carloads	23.05
Ton lots	24.95
Less ton lots	25.95

SMZ

Contract prices, cents per pound of alloy, delivered, 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe ½ in. x 12 mesh.

Ton lots	19.65
Less ton lots	20.90

V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, V-5; 38-42% Cr, 17-19% Si, 8-11% Mn, packed.

Carload lots	17.20
Ton lots	18.70
Less ton lots	19.95

Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. Si 48 to 52%, Ti 9 to 11%, Ca 5 to 7%.

Carload packed	18.50
Ton lots to carload packed	19.65
Less ton lots	20.90

Ferromanganese

Maximum contract base price, f.o.b., lump size, base content 74 to 76 pct Mn.

Producing Point	Cents per-lb
Marietta, Ashtabula, O.; Alloy, W. Va.; Sheffield, Ala.; Portland, Ore.	10.25
Johnstown, Pa.	10.25
Sheridan, Pa.	10.25
Philo, Ohio	10.25
S. Duquesne	10.25

Add or subtract 0.1¢ for each 1 pct Mn above or below base content.

Briquets, delivered, 66 pct Mn:

Carloads, bulk	12.50
Ton lots packed	14.70

Spiegeleisen

Contract prices, per gross ton, lump, f.o.b. Palmerton, Pa.

Manganese	Silicon	
16 to 19%	3% max.	$83.50
19 to 21%	3% max.	91.50
21 to 23%	3% max.	94.00

Manganese Metal

Contract basis, 2 in. x down, cents per pound of metal, delivered.
95.50% min. Mn, 0.2% max. C, 1% max. Si, 2.5% max. Fe.

Carload, Packed	45.75
Ton lots	47.25

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, f.o.b. Marietta, O., delivered, cents per pound.

Carloads	30.00
Ton lots	32.00
250 to 1999 lb	34.00
Premium for hydrogen-removed metal	0.75

Medium Carbon Ferromanganese

Mn 80% to 85%, C 1.25 to 1.50, Si 1.50% max. Contract price, carloads, lump, bulk, delivered, per lb of contained Mn... 22.35

Low-Carb Ferromanganese

Contract price, cents per pound Mn contained, lump size, del'd Mn 85-90%.

	Carloads	Ton	Less
0.07% max. C, 0.06% P, 90% Mn	33.00	35.55	36.75
0.07% max. C	30.95	33.50	34.70
0.10% max. C	30.20	32.75	33.95
0.15% max. C	29.45	32.00	33.20
0.30% max. C	27.95	30.50	31.70
0.50% max. C	27.45	30.00	31.20
0.75% max. C, 80-85% Mn, 5.0-7.0% Si	24.45	27.00	28.20

Silicomanganese

Contract basis, lump size, cents per pound of metal, 65-68% Mn, 18-20% Si, 1.5% max. C for 2% max. C, deduct 0.2¢ f.o.b. shipping point.

Carload bulk	11.50
Ton lots	12.95
Briquet contract basis carloads, bulk, delivered, per lb of briquet	13.15
Ton lots, packed	15.35

Silvery Iron (electric furnace)

Si 15.50 to 16.00 pct, f.o.b. Keokuk, Iowa, or Wenatchee, Wash., $98.50 gross ton, freight allowed to normal trade area. Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., $93.00.

Silicon Metal

Contract price, cents per pound contained Si, lump size, delivered, packed.

	Ton lots	Carloads
96.50% Si, 2% Fe	22.75	21.45
98% Si, 1% Fe	23.25	21.95

Silicon Briquets

Contract price, cents per pound of briquets, bulk, delivered, 40% Si, 2 lb Si briquets.

Carloads, bulk	7.15
Ton lots, packed	9.75

Electric Ferrosilicon

Contract price, cents per lb contained Si, lump, bulk, carloads, f.o.b. shipping point.

50% Si	12.75	75% Si	15.40
65% Si	14.50	85% Si	17.10
	90% Si	18.50	

Calcium Metal

Eastern zone contract prices, cents per pound of metal, delivered.

	Cast	Turnings	Distilled
Ton lots	$2.05	$2.95	$3.75
Less ton lots	2.40	3.30	4.55

Ferrovanadium

50-55% V contract, basis, delivered, per pound, contained V, carloads, packed.

Openhearth	3.10
Crucible	3.20
High speed steel (Primos)	3.30

Alsifer, 20% Al, 40% Si, 40% Fe, Contract basis, f.o.b. Suspension Bridge, N. Y., per lb.

Carloads	10.65¢
Ton lots	11.80¢

Calcium molybdate, 43.6-46.6% f.o.b. Langeloth, Pa., per pound contained Mo ... $1.34

Ferrocolumbium, 50-60%, 2 in. x D contract basis, delivered per pound contained Cb.

Ton lots	$6.90
Less ton lots	6.95

Ferro-tantalum-columbium, 20% Ta, 40% Cb, 0.30% C, contract basis, del'd, ton lots, 2-in. x D per lb con't Cb plus Ta ... $4.65

Ferromolybdenum, 55-75%, 200-lb containers, f.o.b. Langeloth, Pa., per pound contained Mo.. $1.54

Ferrophosphorus, electric, 23-26%, car lots, f.o.b. Siglo, Mt. Pleasant, Tenn., $4.00 unitage, per gross ton ... $90.00
10 tons to less carload ... $110.00

Ferrotitanium, 40% regular grade, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti ... $1.35

Ferrotitanium, 25% low carbon, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti ... $1.50
Less ton lots ... $1.55

Ferrotitanium, 15 to 18% high carbon, f.o.b. Niagara Falls, N. Y., freight allowed, carload, per net ton ... $177.00

Ferrotungsten, ¼ x down, packed, per pound contained W, ton lots, delivered ... $3.45

Molybdic oxide, briquets, per lb contained Mo, f.o.b. Langeloth, Pa. ... $1.33
bags, f.o.b. Washington, Pa., Langeloth, Pa. ... $1.30

Simanal, 20% Si, 20% Mn, 20% Al, contract basis, f.o.b. Philo, Ohio, freight allowed, per lb.

Carload, bulk lump	17.50¢
Ton lots, packed lump	19.50¢
Less ton lots	20.00¢

Vanadium oxide, 86 - 89% V_2O_5 contract basis, per pound contained V_2O_5 ... $1.33

Zirconium contract basis, per lb of alloy
35-40%, f.o.b. freight allowed, carloads, packed ... 26.25¢
12-15%, del'd, lump, bulk-carloads ... 8.50¢

Boron Agents

Borosil, contract prices per lb of alloy del. f.o.b. Philo, Ohio, freight allowed. B, 3.14%, Si 40-45%, per lb contained 2 ... $5.25

Bortam, f.o.b. Niagara Falls

Ton lots, per pound	45¢
Less ton lots, per pound	50¢

Corbortam, Ti 15-21%, B 1-2% Si 2-4%, Al 1-2%, C 4.5-7.5% f.o.b. Suspension Bridge, N. Y., freight allowed
Ton lots per pound ... 10.00¢

Ferroboron, 17.50% min. B, 1.50% max. Si, 0.50%, max. Al, 0.50% max. C, 1 in. x D, ton lots ... 1.20
F.o.b. Wash., Pa.; Niagara Falls, N. Y. delivered 100 lb up

10 to 14% B	.85
14 to 19% B	1.20
19% min. B	1.50

Grainal, f.o.b. Bridgeville, Pa., freight allowed, 100 lb and over

No. 1	$1.05
No. 79	50¢

Manganese - Boron, 75.00% Mn, 15-20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C, 2 in. x D, del'd.

Ton lots	$1.46
Less ton lots	1.57

Nickel-Boron, 15-18 B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni, del'd less ton lots ... $2.05

"John, how do you feel about these new services we've lined up for Iron Age advertisers for 1956?"

. . . asked of John DeWolf, Vice-President, G. M. Basford Co., leading industrial advertising agency

"I welcome them. I'm sure they will prove very valuable to us — and to our clients. To me, business-paper leadership requires more than just good editorial content and a good circulation statement. To be a leader a paper must also help the advertiser with his advertising and marketing problems. Your new services are a stepping up of this kind of help by a paper that is, of course, a recognized leader."

"What part of this Advertiser Service Program means the most to you, John?"

"Your new advertising readership studies — your Mills Shepard reports. As you well know, I'm convinced that this type of research can show us how to produce more effective advertising — and I'm delighted that Mills Shepard, whom I regard very highly, is making these studies for you. In such an important field as the metalworking market, we need all the help of this kind that we can get."

"What about the Shepard Copy Seminars?"

"They're an extremely valuable part of Mills Shepard's service. The Reports tell us *how* we've done. It is from the seminars that we'll learn *why*. If you can get a group of ad men discussing actual readership scores — under the guidance of an expert like Mills — then you really begin to see what readers are looking for. You learn why some ads get high readership and others on the same class of products don't do so well. Learn that, and you learn how to make your advertising really effective."

Next, we talked to Leon J. Lieberman, Advertising Manager, Alan Wood Steel Co.

"I'm with you all the way, but I'm most impressed with what you call 'readership stimulation.' Those new editorial front covers, highlighting what's hot in metalworking — they pack a wallop. I'm intrigued by the way you've pointed up the content to your four reader functions. The whole idea is alert, progressive. And then, when you showed me how you're going to go even further, and reach out to the reader so he'll reach out even faster for the current IRON AGE — I'm very impressed. You're one of the very first business papers to do this kind of reader promotion."

Then, we quizzed Joe Vinbury, General Sales Manager, Abrasive Machine Tool Co. . . .

"Like the program? Emphatically, yes! It represents a valuable service to advertisers. What rings the bell most with me? Your Market Research Seminars under Oliver Johnson's direction. I've worked with Oliver and your research people in the past. Market research help is essential for someone in my position. Now, if I have the chance to sit in a room with other sales and marketing men with similar problems, and with Oliver to keep us on the beam, we trade experience back and forth — yes sir, that's for me!"

Ask your IRON AGE representative for the full, interesting story of this new Advertiser Service Program.

The **IRON AGE**

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ABP ABC BPA

RITCO

Drop Forgings

Made to your blueprints in many metals, in weights from ¼ to 15 pounds, depending on design. Accurate, smooth, and flash free. Their dense fibrous structure and controlled grain flow gives tremendous strength. Machined if desired.

Upset Forgings

In a great variety of metals and alloys. High strength parts accurately produced —no flash, no blowholes. Excellent machining qualities.

Special Fasteners

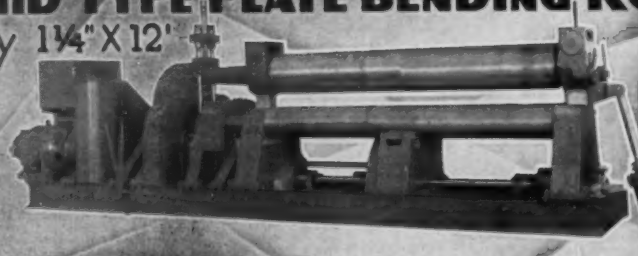
Made to your specifications in any metal or alloy, ferrous or non-ferrous, ground or unground. Bolts to 2" diam., studs to 2½" diam. Fully dependable. Cut or precision rolled threads.

Whatever your requirements in drop forgings, upset forgings, or special fasteners, send your specifications and blueprints to RITCO for estimates.

Exclusive New England Sales Agent for all products of Cleveland Cap Screw Co.

RHODE ISLAND TOOL COMPANY
SINCE 1834
148 WEST RIVER STREET, PROVIDENCE 1, R. I.

PYRAMID TYPE PLATE BENDING ROLL
Capacity 1¼" X 12'



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Made to your specifications in all thicknesses from .002 to .375 inches and widths from ½" to 19" depending upon gauge.

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HOT PRESSED AND SINTERED CARBIDES • VACUUM METALS
HEAVY METAL • CERMETS • HIGH TEMPERATURE ALLOYS
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You see **FREEWAY WASHERS** everywhere...

because they're

made better and cost less!

Regardless of the metal you specify . . . you'll find Freeway Washers are made better, cost less! They're flat, burr-free, concentric . . . to cut assembly time in your own plant. And they're priced LOW . . . because patented dies enable us to pass definite production savings on to you. Quotations gladly submitted.

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Freeway

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P. O. Box 1756, Cleveland 5, Ohio

Gentlemen: Please send us more facts about . . . . .
( ) Washers, ( ) Bearings, ( ) Stampings.

Company . . . . . .

Street . . . . . .

City . . . . . State . . . . . .

Signature . . . . . .

B

RAILWAY EQUIPMENT FOR SALE

Used - As Is - Reconditioned

RAILWAY CARS

All Types

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"ANYTHING containing IRON or STEEL"

News of Used and Rebuilt Machinery

Hot Pace In Cleveland . . . Used machinery is going at such a hot pace in Cleveland these days that salesmen are spending 80 pct of their time out trying to buy something.

Out of town shop operators from as far as California are siphoning off choice pieces of equipment by the carload. The traditional seasonal aspects of the business to a large extent have faded into the background in the present rush to find all types of late model equipment in good condition.

Trade Ups Encouraged . . . Traditional sources of used machinery such as liquidations and government surplus auctions have gone by the board in favor of convincing shop operators they should "trade up" into a later, more precise or faster machine.

Other minor windfalls for used machinery buyers are in the form of idle equipment in shops whose trade-in value surpasses their usefulness, permitting the shop operator to make a new capital investment in a better machine.

Although the natural reaction to such a sellers market would be runaway inflation, prices have only firmed up, not gotten out of hand.

New machinery prices continue to act as a damper on what a good used unit will bring on the market. But since deliveries on these are out to an average of about 6 months, and prices have gone up in the last year, dealers have more "head room" in which to operate.

Auto Subcontractors Active . . . A good part of the heat for used machinery in the Cleveland area continues to lean heavily on automotive subcontracting.

Despite production cutbacks in automaking, the subcontractors are still going full tilt. Stampers especially are constantly on the prowl for usable late model presses for their plants.

What's Selling Best? . . . Almost any type of good late equipment can be sold by dealers after reconditioning.

Bud Corrigan, Noll Equipment Co., Cleveland, puts it this way: "You can't pinpoint any one type of equipment as being more in demand than another.

"The crux of the business nowadays is to ferret out potential prospects who have idle, outdated equipment in their shop and persuade them to let go of it.

"In many cases, the equipment has already been amortized to a given book value. And, if a profit is added to book value, a newer machine can be sold and the idle or outdated one, after reconditioning, can be put to very good use by someone else.

"We are in the market for all types of late model, usable general purpose machinery.

"Our sales aren't much of a problem at the moment since advertising will usually bring in the buyers.

"There are still some good machines left in government warehouses, but most of them are specialized and not too adaptable to general purpose work. They're also pretty well picked over for government use by the time they're put up for auctions. So we do our best to find people who have the machinery in their shop and will release it for something better."

East Is Active . . . Both new and used machinery dealers in Philadelphia expect the first quarter to be one of the best on record. Demand for new, late-model equipment is showing up stronger from the smaller shops. Big shops are still hot after shears, rolls, and brakes. Used equipment sellers also report there's a heavier run by smaller customers on lathes and milling machines.

CONSIDER GOOD USED EQUIPMENT FIRST

ANGLE BENDING ROLLS
1¾"x1¾"x¼" Niagara No. 3
4½"x4½"x⅝" Amplex PBR Horizontal

BALERS
#123P-66 Logemann, Charging Box 66x18x24. Produces Bale 125 to 150 lbs.
Logemann Baler, Charging Box 72x12x18", Produces 300 lb. Bale.

BENDING ROLLS
8' x 3/16" Milton Slip Roll Forming Machine
8' x ⅜" Hilles & Jones Pyramid Type
12' x ⅜" Cleveland Pyramid Type
16' x ¼" Bertsch Initial Type Bending Roll
24' x ⅜" Hilles & Jones Pyramid Type

BRAKES—LEAF TYPE
12' x ⅜" Dreis & Krump
12' x ½" Dreis & Krump, Motor Driven

BRAKES—PRESS TYPE
14' x ¼" Cincinnati Series 120-14

BROACH
Model VP-4-40-40 American Vertical Hydr. Broach, Max. Capacity 60 ton. Stroke 40", Motor Drive

BULLDOZER
#27 Williams & White, 22" Stroke, 16" x 80" Face of Crosshead

CRANES—OVERHEAD ELECTRIC TRAVELING

5 ton	P&H	29' Span 230 Volt D.C.
5 ton	Cleveland	96" Span 230 Volt D.C.
7½ ton	P&H	65' Span 440/3/60 A.C.
10 ton	P&H	58' Span 230 Volt D.C.
10 ton	Milwaukee	80' Span 230 Volt D.C.
10 ton	P&H	96' Span 230 Volt D.C.
15 ton	P&H	56' Span 230 Volt D.C.
20 ton	P&H	60' Span 230 Volt D.C.
20 ton	Toledo	75' Span 550/3/60 A.C.
30 ton	Alliance	50' Span 230 Volt D.C.
120 ton	Whiting	80' Span 220/3/60 A.C.

FLANGING MACHINE
1" McCabe Pneumatic Flanging Machine

FORGING MACHINES
1" to 5" Acme, Ajax, National

FURNACES
Hevi-Duty Electric Furnace, Hot Zone 18" high, 26" Wide Opening, 10'9" Deep I.D.
Sunbeam Stewart Gas Fired Furnace 12" x 36" x 36"
2 ton Swindell Dressler, Top Charge
2.7 ton Heroult Top Charge
15 ton Heroult Top Charge

HAMMERS—BOARD DROP—STEAM DROP FORGING—800 lb. to 20,000 lb.

HAMMERS—MISC.
#3B Lobdell Nazel. Capacity 4" Square
2000 lb. Chambersburg Ceco-Drop

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60" Mesta Four High, 17 Rolls 5¼" Dia.

PLANER—PLATE EDGE
30' x 1¼" Southwark, 16 Pneumatic Jacks
35' x 1¼" Southwark, 16 Pneumatic Jacks

PRESSES—HYDRAULIC
150 ton HPM Double Acting, 36" Max. Ram Travel Bolster 36" x 36"
300 ton United Steam Hydr. Forging Press
530 ton Baldwin Southwark 12" Stroke 48" x 25" Between Columns
800 ton Clearing 48" Stroke, Bed Area 48" x 48"
1000 ton Lake Erie Double Acting 46" Stroke, Bed Area 72" x 146"
1257 ton Baldwin Southwark Forging Press, 30" Stroke Main Ram, 54" x 41" Bet. Columns
2045 ton Birdsboro, 4 Columns, 14" Stroke Piston Platen 42" x 40" Daylite 47"
4500 ton B-L-H Hydr. Forging Press

PRESS—STRAIGHT SIDE
Clearing Model TF41500-200 Triple Acting. Strokes 40, 32, 14". Bed Area 100" x 200"
Verson S1-40 Mech. Eccentric Type Single Point Suspension Press. 200 ton, 30" Stroke

PUNCH & SHEAR COMBINATIONS
#1½ Buffalo Universal Ironworker
Style EF Cleveland 36" Throat, Punch 1¼" thru 1"
Style W Cleveland Single End, 60" Throat, 312 Ton

ROLL—PLATE STRAIGHTENING
72' Bertsch, Seven 7" Dia. Rolls

ROLLING MILLS
12" x 16" Phila. Single Stand, Two High
15" x 28" Farrel Single Stand, Two High
15" x 30" G & M Single Stand Two High
16" x 24" Farrel Single Stand Two High
22" x 40" Achen, Single Stand Two High
22" x 12" x 40" Lewis 3-High Sheet Mill

ROLLS—FORMING
8 Stand Rafter Tube Forming Machine, Spindle 1⅞"
5 Stand Bliss Roll Forming Machine, Shaft 2⅞"

SHEAR—GATE
80" x ⅝" Pels

SHEAR—ANGLE
6 x 6 x ⅝" Hilles & Jones

SHEAR—BAR
#4 H & J Guillotine, Capacity 3½" Square, 4" Round

SHEARS—SQUARING
10' x12 Ga., Niagara No. 501B
12' x 36" Cincinnati #1412
12' x ⅜" Loy & Nawrath

SLITTERS
G-48 Yoder Gang Slitter, 5" Threaded Arbor
5-30 Yoder Slitter, 7" Plain Arbor

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1—10 Ton Whitcomb Diesel

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10 Ton OET 20 ft Span 230 V. D.C.

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2—515 C. F. M. Inger. Rand 40 T—HP

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DIRECT CURRENT MOTORS

Qu.	H.P.	Make	Type	Volts	R.P.M.
2	3000	Whse.	Mill	525	600
6	1500	Whse.	Mill	525	600
1	1250	G.E.	MCF	600	350/790
4	800	Whse.	Encl.	525	600
4	700	Whse.	Mill	250	300/700
2	600	Al. Ch.	Mill	600	300/600
2	500	Whse.	Mill	250	285/710
1	450/250	Al. Ch.	Mill	375/250	250/1000
1	450	Whse.	SK	230	450/600
1	350	G.E.	CD-169	230	1150
1	200/250	El. Dy.	Ped. Brg.	230	400/1200
1	200	Whse.	SK-210	230	400/800
1	180	G.E.	MPC	230	400
1	150	Whse.	SK-201	230	300/900
2	125	Whse.	SK-184	230	575/850
1	125	G.E.	MPC	230	400/600
1	100	El. Dy.	30-S	230	450/1350
2	100	El. Dy.	30-S	230	475/950
1	80	Reliance	651-T	230	575/1150
3	50	Whse.	SK-131.5	230	400/2200
1	40	G.E.	CD-123	230	500/1000
1	40	Whse.	SK-149	230	500/1700
1	32½	Whse.	SK-150	230	400/1200
2	25	Whse.	SK-93	230	1800
1	20	Cr. Wh.	D.P.B.B.	230	1150/2400
1	20	Whse.	SK-123	230	400/1200
1	15	G.E.	CD-85	230	575/2300
3	15	Whse.	SK-100L	230	500/1500
1	15	Reliance	155-T	230	400/1600
1	10	Whse.	SK-105	230	400/1600
1	10	Al. Ch.	E-122	230	380/1200
4	10	Whse.	SK-91	230	250/1000
1	7½	G.E.	CD-75	230	400/2070
1	7½	G.E.	CD-85	230	450/1350
4	5/7½	Reliance	T.E.F.C.	230	337/1350

MOTOR GENERATOR SETS

Qu.	KW	Make	R.P.M.	D.C. Volts	A.C. Volts
1	2500	Whse.	720	600	4160/2300
2	1250	Whse.	720	600	2300
1	500	Cr. Wh.	720	600	2300/440
2	500	Whse.	1200	125/250	2300/440
1	400	Cr. Wh.	1200	125/250	2300/440
1	300	G.E.	1200	250	2300
3	200	G.E.	900	125/250	2300
1	150	G.E.	1200	250	2300
1	100	Whse.	900	250	2300
1	100	Cr. Wh.	1200	125	440/220
1	75	G.E.	1200	250	440/220
3	50	G.E.	1200	250	440/220

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A. C. MOTORS
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SLIP RING

Qu.	H.P.	Make	Type	Volts	Speed
1	1500	G.E.	MT-498	2300	360
1	1000	A.C.	Mill	2300	240
1	800	G.E.	MT	2300	293
1	750	G.E.	MT-573	2200	1190
1	700	A.C.		2300	500
1	500	G.E.	MT-412	2200	580
1	500	Whse.	CW	550	350
1	500	G.E.	M-569Z	2200	1180
1	400	Whse.	CW-960A	440	1170
1	400	Whse.	CW	440	514
1	400	Whse.	CW-1213	2200	435
1	350	G.E.	MT-442Y	2200/4000	253
1	350	G.E.	IM-17A	440/2200	720
1	250	G.E.	MT-424Y	4000	257
1	250	G.E.	MT-559S	2200	1800
1	250	Al. Ch.		550	600
1	200	Cr. Wh.	26QB	440	505
1	200	G.E.	IM	440	435
1	200	G.E.	IM	2200	580
1	150	(unused) Whse.	CW	2300	435
3	125	A.C.		440	865
1	125	Al. Ch.		440	720
1	100	G.E.	IM-16	2200	435
1	100	G.E.	IM	440	600
4	100	A.C.	ANY	440	695

SQUIRREL CAGE

1	800	G.E.	KT-573	2200	1180
3	650	G.E.	PT-559BY	440	3570
1	500	G.E.	K-6345-S	2300	1185
2	450	Whse.	CS-1429	2300/4150	354
1	400	G.E.	IE-15B	2200	1165
1	400	G.E.	IK	2200	500
1	200	G.E.	IK-17	440	580
3	200	G.E.	KT-557	440	1800
1	150/75	G.E.	IK	440	900/450
1	150	Whse.	CS-8568	440	880
1	150	Whse.	CS	440	580
2	125	Al. Ch.	ARW	2200	1750
1	100	Whse.	CS-876C-TEFC	440	710

SYNCHRONOUS

2	2080	Whse.		2300	120
2	1750	G.E.	ATI	2300	3600
2	735	G.E.	ATI	2300/12000	600
1	580	Ideal	SM	2300/4160	1800
2	500	G.E.	TS-7567	2200	1200
1	450	Whse.		2200	128.5
1	450	Whse.		2200	450
1	400	G.E.	TS-7585	2200	1200
1	400	G.E.	TS	2200	600

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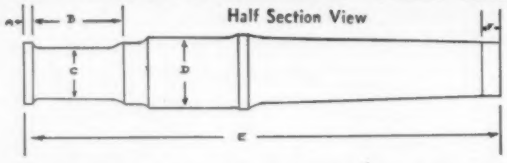

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200	Westg.	SK-201	650
200	Cr. Wh.	CM	500
175	G.E.	ELC	750
100	G.E.	MPC	400/800
100	G.E.	RC-34	2500
100	G.E.	RC-19	575
100/150	G.E.	MCF	380/1000
50/120	G.E.	MCF	250/1000
50	Cr. Wh.	CMC	700/1100
50	G.E.	DLC-204	650
35	Westg.	SK-150	350/1000
30	Cr. Wh.	CCM-504	450
30/40	G.E.	CD-115	500/1500
25	G.E.	RC-32	800
25	Westg.	SK-133	575
20/25	Westg.	SK-151L	250/1000
20	Star	SH-10	1750
15	Westg.	SK-103	400/1600
10/15	Reliance	185T	400/1600
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24'' x 8' LeBlond H. D. engine lathe.
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15'' x 30'' Lipe Carbe-Matic, 1942.

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1-18 Cincinnati production.
2-18 Cincinnati production, late model.
Model 2-20 Kent-Owens hyd. mill, late (2).
60'' x 48'' x 16' Ingersoll adj., rail planer type.
No. 3H K & T plain heriz., new 1942.

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48'' x 48'' x 10' Gray Maxi-Service.

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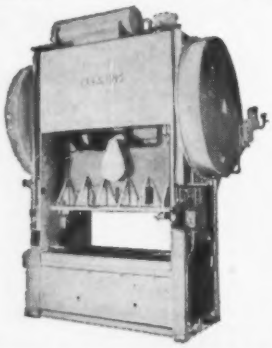

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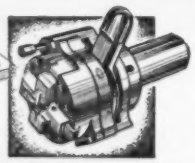

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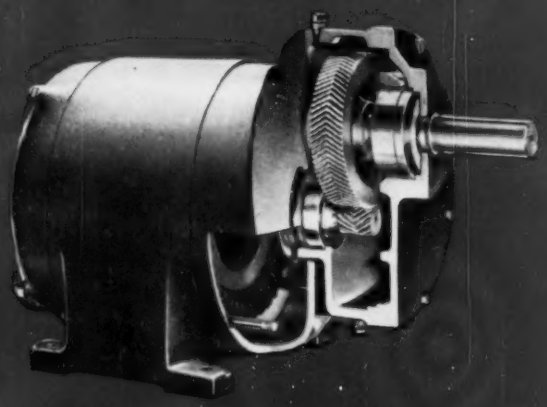

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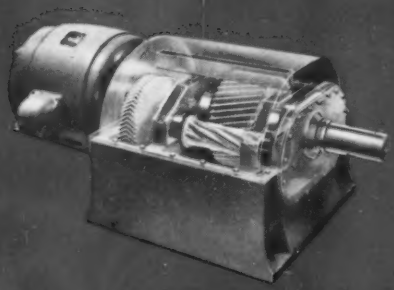

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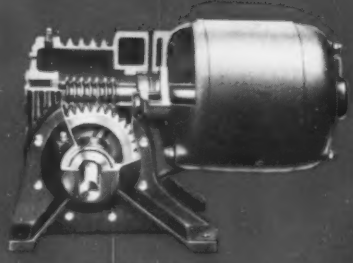

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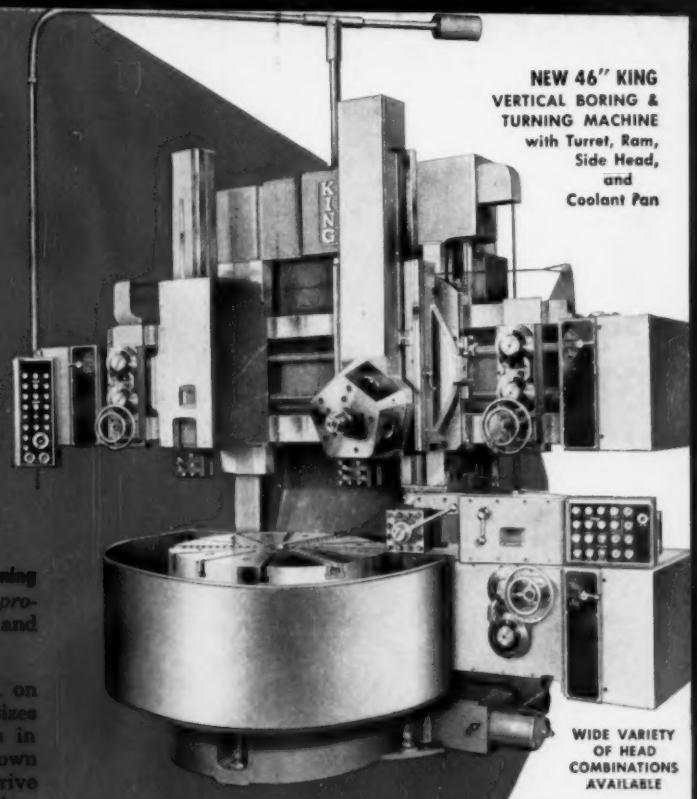

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All electrical controls are conveniently located on the pendant station and on a fixed panel mounted on the side head. The following controls are located on the pendant, in areas indicated:

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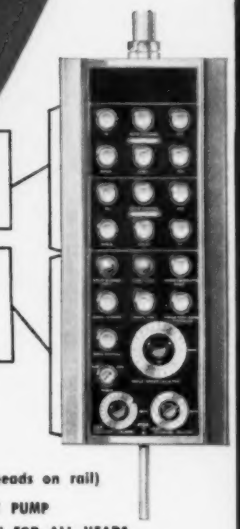
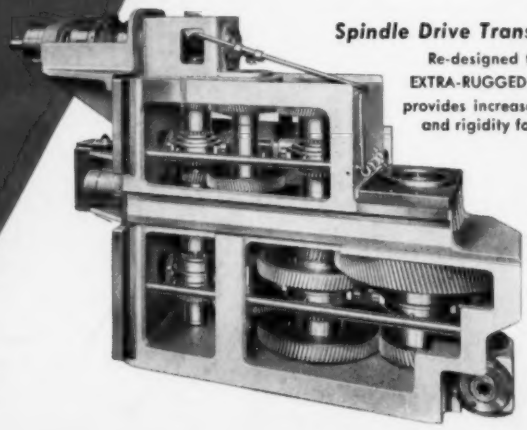
POWER SWIVELING OF RAIL HEADS

PRE-SELECTIVE SPEED SELECTION FROM DIRECT-READING DIAL
SELECTION OF RAIL HEAD FEEDS FROM DIRECT-READING DIALS
SPEED CHANGE · TURRET INDEX · TABLE STOP



FIXED PANEL on Side Head has controls for:
FEED SELECTION FROM DIRECT-READING DIAL
FEED AND RAPID TRAVERSE MOVEMENTS OF SIDE HEAD (on machines with two heads on rail)
MAIN DRIVE · RAIL POSITIONING · COOLANT PUMP
THREAD CUTTING & TAPER TURNING SELECTION FOR ALL HEADS



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